

Cytec Industries Inc.
Fortier Manufacturing Complex
Waggaman, Louisiana
Jefferson Parish

EPA I.D. No. LAD 008175390

Hazardous Waste
Permit Application

Volume VI

June, 1998

Cytec Industries Inc.

Fortier Manufacturing Complex

**Waggaman, Louisiana
Jefferson Parish**

EPA I.D. No. LAD 008175390

**Hazardous Waste
Permit Application**

Volume VI

June, 1998

Summary of Contents

Volume I

Summary of Contents
Table of Contents
Transmittal Letter
Computer Diskettes
IT Response
Certification
Form HW-1
Part I//Part A
Chapter Responses

Volume II

Appendices A through M

Volume III

Appendices N through Q

Volume IV

Appendices R through BB

Volume V

Appendices CC through JJ

Volume VI

Appendices KK through LL

Volume VII

Appendices MM through PP

TABLE OF CONTENTS

Volume VI

Appendix KK	LAC 33:V.523.A LAC 33:V.1905.A., D., G.
Appendix LL	LAC 33:V.523.B., D., G.
Table B-1	Dimensions and Capacity of Each Tank
Table B-2	Tank Drawing Index
Table D-1	Piping Instrumentation and Process Flow Diagrams
Table G-1	Tank System Secondary Containment Information Summary
Table G-2	Tank Containment Information

**Cytec Industries Inc. - Fortier
EPA I.D. No. LAD 008175390**

**Waggaman, Jefferson Parish
Chemical Plant
Hazardous Waste Permit Application**

June, 1998

Appendix KK

**LAC 33:V.523.A
LAC 33:V.1905.A., D., G.**

Hazardous Waste Tank Assessments

Hazardous Waste Tank Systems

Cytec Industries Fortier Facility LAD 008 175 390

Tank System Assessment Index

Assmt.

No.

By

Report Number

Assessment Type

Tank Number

Tank Name

TA1 Nelson 88209

Tank Modification Installation Assessment	MET-1	Miscellaneous Effluent Tank 1
New Tank Installation Assessment	MET-2	Miscellaneous Effluent Tank 2
Tank Containment Installation Assessment	MET-1	Miscellaneous Effluent Tank 1
Tank Containment Installation Assessment	MET-2	Miscellaneous Effluent Tank 2
New Tank Installation Assessment	TA-501 A	WWCB Backwash Tank - North
New Tank Installation Assessment	TA-501 B	WWCB Backwash Tank - South
Tank Containment Installation Assessment	TA-404	Primary Filter Feed Tank
Tank Containment Installation Assessment	TA-403	Catalyst Settling Tank
Tank Containment Installation Assessment	T-500	MET Injection Tank
Tank Containment Installation Assessment	MF-307	Secondary Filter Feed Tank
Tank Containment Installation Assessment	100-6	RCB / MET Backwash Tank
Tank Containment Installation Assessment	CF-401 A	WW Cartridge Filter
Tank Containment Installation Assessment	CF-401 B	WW Cartridge Filter
Tank Containment Installation Assessment	CF-401 C	WW Cartridge Filter
Tank Containment Installation Assessment	CF-401 D	WW Cartridge Filter
Tank Containment Installation Assessment	HRD-V50 A	MET Filter A
Tank Containment Installation Assessment	HRD-V50 B	MET Filter B
Tank Containment Installation Assessment	HRD-V50 C	MET Filter C
Tank Containment Installation Assessment	HRD-V50 D	MET Filter D
Tank Containment Installation Assessment	F-401 A	WW Primary Filter A
Tank Containment Installation Assessment	F-401 B	WW Primary Filter B
Tank Containment Installation Assessment	F-401 C	WW Secondary Filter C
Tank Containment Installation Assessment	F-401 D	WW Secondary Filter D
Tank Containment Installation Assessment	TA-402	WWCB Well Injection Tank

Assmt.**No.****By****Report Number**

Assessment Type			Tank Number	Tank Name
TA1	Nelson	88209		
	Tank Containment Installation Assessment		100-5 A	RCB Filter A
	Tank Containment Installation Assessment		100-5 B	RCB Filter B
	Tank Containment Installation Assessment		100-5 C	RCB Filter C
	Tank Containment Installation Assessment		TA-501 A	WWCB Backwash Tank - North
	Tank Containment Installation Assessment		TA-501 B	WWCB Backwash Tank - South
TA2	TERA	89-152-1		
	Replacement Vessel Design Assessment		F-401 D	WW Secondary Filter D
	Replacement Vessel Installation Assessment		F-401 D	WW Secondary Filter D
TA3	TERA	91-129		
	Replacement Tank Design Assessment		100-6	RCB / MET Backwash Tank
TA4	TERA	94-100-054-02		
	Replacement Tank Installation Assessment		100-6	RCB / MET Backwash Tank
TA5	TERA	95-100-031-A		
	Replacement Vessel Design Assessment		F-401 C	WW Secondary Filter C
TA6	TERA	95-100-066		
	Replacement Vessel Installation Assessment		F-401 C	WW Secondary Filter C
TA7	TERA	96-100-073		
	Replacement Tank Design Assessment		TA-402	WWCB Well Injection Tank
TA8	Linder	97-2025M03		
	Replacement Tank Installation Assessment		TA-402	WWCB Well Injection Tank
TA9	Linder	97-2025M06		
	New Tank System Design Assessment		101-52	MMA Lab Collection Tank

AMERICAN CYANAMID COMPANY
CHEMICAL PRODUCTS DIVISION
FORTIER PLANT
10800 RIVER ROAD
WESTWEGO, LOUISIANA 70094

HAZARDOUS WASTE SYSTEM
NEW TANK SYSTEM COMPONENTS
MISCELLANEOUS EFFLUENT TANKS AND WWCB TANKS
INSTALLATION CERTIFICATION

Prepared By:

WALDEMAR S. NELSON AND COMPANY
INCORPORATED
ENGINEERS AND ARCHITECTS

1200 St. Charles Avenue
New Orleans, LA 70130

REVIEWED BY

WAP
W.G.P.

JOB NO. 88209

November 15, 1988

88209.AB1

MISCELLANEOUS EFFLUENT TANKS

TANK DESCRIPTIONS:

MET-1.0

MET-1.0 is a 60'-0" I.D. x 48'-0" high carbon steel (ASTM A283C shell) API 650 cone roof tank of 1,000,000 gallons nominal capacity built in 1977 by the Fisher Tank Company for the purpose of fuel oil storage. The tank was modified for miscellaneous effluent service in 1988 by Maloney-Crawford. An aggregate filled 80 mil HDPE liner, sloped to a leak detection drain was installed on the existing bottom and a new 3/8" steel bottom was installed on top of the gravel. Nozzle and manway changes were also made. The tank is on an existing pile supported concrete slab foundation.

MET-2.0

MET-2.0 is a 93'-0" I.D. x 40'-0" high carbon steel (ASTM A516 Gr. 70 shell) API 650 cone roof tank of 2,000,000 gallons nominal capacity built by Anderco, Inc., in 1988 for miscellaneous effluent service. The tank was installed on a pile supported concrete slab foundation which incorporates an aggregate filled 80 mil HDPE liner, sloped to a leak detection drain.

ANCILLARY EQUIPMENT DESCRIPTION:

The ancillary equipment installed includes four 125 HP transfer pumps with back pressure control recycle valves, three 10 HP sump pumps, manual valves, strainers and piping.

SECONDARY CONTAINMENT AND STRUCTURAL STEEL DESCRIPTION:

The secondary containment installed consists of reinforced concrete paving which surrounds the tanks and is bordered by a reinforced concrete dike with all joints sealed. A large sump sealed with concrete sealant was installed on the north side of the containment. A galvanized structural steel platform to support the pumps and associated piping and equipment was installed above the sump. Galvanized structural steel pipe supports were installed to support the piping.

WWCB TANKS

TANK DESCRIPTIONS:

WWCB-N & WWCB-S

WWCB-N and -S are two 30'-0" O.D. x 30'-0" high 316 stainless steel API 650 covered tanks of 150,000 gallons nominal capacity built in 1988 by Anderco Inc., for waste water column bottoms service. The tanks were installed on pile supported concrete slab foundations which incorporate aggregate filled HDPE liners, each sloped to a leak detection drain.

OTHER TANK FOUNDATIONS AND LEAK DETECTION SYSTEMS:

Foundations for the Primary Filter Feed Tank, Catalyst Settling Tank, Miscellaneous Effluent Surge Tank and Well Injection Tank were modified to provide aggregate filled HDPE liners, each sloped to a leak detection drain. New reinforced concrete slab foundations incorporating aggregate filled HDPE liners sloped to leak detection drains were installed for the Secondary Filter Feed Tank, Acetic Acid Tank and the Wash Acid Tank. New reinforced concrete slab foundations suitable for installing aggregate filled HDPE liners sloped to leak detection drains were installed for the replacement NSB Back Wash Tank and NSB Surge Tank.

ANCILLARY EQUIPMENT DESCRIPTION:

The ancillary equipment installed includes manual valves, piping, a pump station with two 100 GPM transfer pumps and two 50 GPM sump pumps located

near the WWCN-N and WWCN-S tanks, a 50 GPM sump pump near the Secondary Filter Feed Tank, a 50 GPM sump pump near the Miscellaneous Effluent Surge Tank and a 50 GPM sump pump near the NSB Tank foundations. Two new Miscellaneous Effluent Sand Filters and associated items were installed near the existing ones.

SECONDARY CONTAINMENT AND STRUCTURAL STEEL DESCRIPTION:

The secondary containment installed consists of two reinforced concrete paved and diked areas with all joints sealed. The north containment surrounds the new filters, the miscellaneous effluent area, the WWCN filtration area, the waste acid filtration area, the NSB filtration area, the Aceto Surge Tank and the flare. A sump sealed with concrete sealant is installed near the miscellaneous effluent surge tank and another near the NSB Tank foundations. Galvanized structural steel platforms are installed at these points to support the pumps. The south containment has acid resistant topping and consists of an east and west sub area connected by a concrete box culvert. The east sub area surrounds the WWCN-N Tank, the WWCN-S Tank, the Primary Filter Feed Tank and the Catalyst Settling Tank. The west sub area surrounds the Secondary Filter Feed Tank, the Acetic Acid Tank and the Wash Acid Tank. A large sump sealed with concrete sealant is installed near the WWCN-N and WWCN-S Tanks and a smaller one near the Secondary Filter Feed Tank. Galvanized structural steel platforms to support the pumps were installed above the sumps. Galvanized structural steel pipe supports were installed to support the piping.

INSPECTION ACTIVITIES:

In order to ensure proper installation, field inspections were made during all phases of construction, and certifications based on these inspections are attached.

Tank Foundations

- a. Pile driving was observed, and pile driving logs and purchase orders were reviewed.
- b. Forms were inspected and rebar size and placement verified prior to pours. Concrete placement was observed and slump tests made. Concrete mix design and cylinder compression tests were reviewed.

Secondary Containment and Leak Detection

- a. Forms were inspected and rebar size and placement verified prior to pours. Concrete placement was observed and slump tests made. Concrete mix design and cylinder compression tests were reviewed.
- b. Joint seals were inspected and concrete sealant application in sumps was observed. Vendor data for sealing compounds was reviewed.
- c. Acid resistant topping was inspected. Vendor data for the topping was reviewed.
- d. Installation of field welded 80 mil high density polyethylene liners under tanks was observed. Samples were taken and lab tested, and vendor data was reviewed. Aggregate fill was also inspected.

Tanks

- a. Unloading of materials, erection and joint inspection of MET-2.0, WWCB-N and WWCB-S were observed. Materials, welding procedures, welder qualifications, and manufacturer's certification letters were reviewed. Vacuum testing and water fill testing were observed.
- b. Unloading of materials, erection and joint inspection for modifications to MET-1.0 were observed. Materials, welding procedures, welder qualifications, and manufacturer's certification were reviewed. Vacuum testing and water fill testing were observed. Surface preparation, application and testing of the internal coating was observed, and the vendor data was reviewed.

Ancillary Equipment

- a. Installation and test of pumps and filters and field fabrication, erection and hydrotest of piping and valves were observed. Pipe supports were inspected. Material lists, test records, welding procedures, welder qualifications and vendor data were reviewed. Support of piping and equipment was inspected.

Structural Steel and Pipe Supports

- a. Installation of pump support and access structures and pipe supports was observed, and vendor shop drawings and material lists were reviewed.

I, August J. Albano, have supervised the inspection of a portion of the installation of the new tank system components located at Avondale, Louisiana, owned and operated by American Cyanamid Co. This included inspecting for weld breaks, punctures, scrapes of protective coatings, cracks, corrosion and other structural damage or inadequate construction/installation, tank and piping tightness test and adequate support and protection of piping from external and internal loads for the following new tank system components: Miscellaneous Effluent Tanks, WWCB Tanks and ancillary equipment as generally shown on Drawings 36-0-21 and 10-0-60 and as described above, as required by the Resource Conservation and Recovery Act (RCRA) regulations, namely, 40 CFR 264.192 (b), (d), and (e).

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments pertaining to the above and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

August J. Albano 11/15/88

Signature

Project Engineer

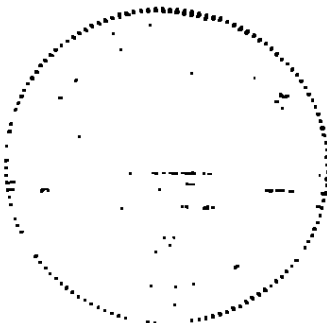
Title

10245

Registration No.

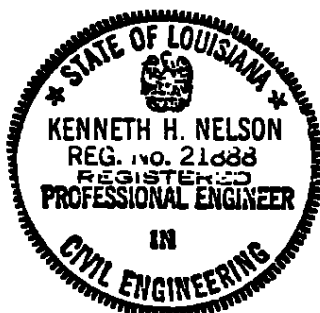
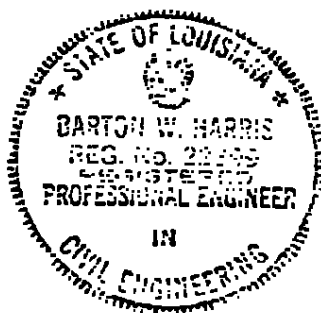
1200 St. Charles Avenue

Address



We, Kenneth H. Nelson and Barton W. Harris, have inspected a portion of the installation of the new tank system components located at Avondale, Louisiana, owned and operated by American Cyanamid Co. Our duties were inspecting piling, reinforced concrete, HDPE liners and structural steel for the following new tank system components: Miscellaneous Effluent Tank MET-2.0, WWCN-N and -S Tanks, NSB Surge and Backwash Tanks, Secondary Filter Feed Tank, Acetic Acid Tank and Wash Acid Tank New Foundations; Primary Filter Feed Tank, Catalyst Settling Tank, Miscellaneous Effluent Surge Tank T-500 and Well Injection Tank Modified Foundations; ancillary equipment; structural steel supports; secondary containment and leak detection systems as required by the Resource Conservation and Recovery Act (RCRA) regulation(s), namely, 40 CFR 264.192 (b) and (e) and 264.193 (b), (c), (d) (e) and (f).

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments pertaining to the above and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.



Barton W. Harris 11/15/88
Kenneth H. Nelson 11/15/88

Signatures

Civil Engineer

Title

21888

22399

Registration Nos.

1200 St. Charles Avenue

Address

HAZARDOUS WASTE SYSTEM
REPLACEMENT COMPONENT
- DESIGN AND INTEGRITY ASSESSMENTS
WWCB SECONDARY SAND FILTER

To:

AMERICAN CYANAMID COMPANY
Westwego, Louisiana

 **TERA, inc.**



TERA, Inc.

6440 Hillcroft, Suite 200
P.O. Box 740038, Houston, Texas 77274, Tel. 713/772-0876, Fax: 713/981-7713

89-152-1

HAZARDOUS WASTE SYSTEM
REPLACEMENT COMPONENT CERTIFICATION

I have supervised and reviewed the design and integrity assessments for the replacement "WWCB Pretreatment System" Secondary Sand Filter at the American Cyanamid Company Fortier Plant in Westwego, Louisiana. My duties were reviewing, performing, and witnessing the design and integrity assessments for the replacement Sand Filter. This work, as described in the attached report dated February 28, 1990 was performed in accordance with applicable portions of Resource Conservation and Recovery Act (RCRA) regulations 40 CFR 264.192 and the corresponding requirements of LAC 33:V.1905.

With regard to this duty, I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all related attachments and that, based on my observations and my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Thomas H. Wimbrow

Registered Professional Engineer

Louisiana No. 23062

TERA, Inc.

P. O. Box 740038

Houston, Texas 77274

Signed: 

Date: MARCH 19, 1990



TERA, Inc.

6440 Hillcroft, Suite 200
P.O. Box 740038, Houston, Texas 77274, Tel. 713/772-0876, Fax: 713/981-7713

March 5, 1990
89-152-1

Ms. Carolyn Donohue
AMERICAN CYANAMID COMPANY
10800 River Road
Westwego, Louisiana 70094

Subject: Replacement WWCB Secondary Sand Filter Certification

Dear Ms. Donohue:

Submitted here is our certified design and integrity assessment report for the replacement WWCB Secondary Sand Filter at Cyanamid's Fortier plant. The report includes assessment and certification of the replacement filter design and documentation of the tightness testing performed.

The main report body summarizes assessment results in a format corresponding to the rules being addressed. Detailed information and documentation are presented in an appendix.

The replacement Sand Filter is located in a process containment area. An assessment of the secondary containment provisions for the replacement Filter was not included in the scope of this project.

We have enjoyed working with you on this interesting project, and look forward to another opportunity to be of service to Cyanamid. Please contact us at 713/772-0876 if you have any questions.

Very truly yours,

TERA, Inc.

Thomas H. Wimbrow, P.E.
Senior Mechanical Engineer

THW/lf

Enclosure: Three (3) Copies TERA Report 89-152-1

MARCH 19, 1990

HAZARDOUS WASTE SYSTEM
REPLACEMENT COMPONENT
DESIGN AND INTEGRITY ASSESSMENTS
WWCB SECONDARY SAND FILTER

* * *

To

AMERICAN CYANAMID COMPANY
Westwego, Louisiana

* * *

By

TERA, Inc.
Houston, Texas
March 1990

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
I. COMPONENT DESCRIPTION.....	1
II. DESIGN ASSESSMENT	
A. Design Standards.....	2
B. Hazardous Characteristics of the Waste.....	3
C. Corrosion Protection and Material Compatability...	3
D. Other Design Considerations	
1. Foundation.....	3
2. Vessel Structural Support and Anchorage.....	4
3. Vessel Structural Strength and Seams.....	4
4. Connections.....	4
5. Pressure and Overfill Controls.....	5
6. Ancillary Equipment.....	5
III. INSTALLATION INSPECTION.....	5
IV. TIGHTNESS TESTING.....	6
V. CONCLUSIONS OF ASSESSMENTS AND TESTING.....	6

APPENDIX A - Design and Assessment Documentation

HAZARDOUS WASTE SYSTEM
REPLACEMENT COMPONENT
DESIGN AND INTEGRITY ASSESSMENTS

This report documents the design and integrity assessments which were performed for the replacement WWCB Secondary Sand Filter at the American Cyanamid Fortier Plant in Westwego, Louisiana. These assessments were performed and this report was prepared to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 and the corresponding requirements of LAC 33:V.1905, as specified by the LDEQ-HWD authorization letter dated May 8, 1989.

I. COMPONENT DESCRIPTION

The replacement Waste Water Column bottoms (WWCB) Secondary Sand Filter is an 84 inch inside diameter by 132 inch seam-to-seam vertical pressure vessel with dished heads. It is constructed of welded stainless steel and has a capacity of approximately 3600 gallons. Design pressure for the new filter is 100 psig. Normal operating pressure is less than 50 psig. The Secondary Sand Filter is supported above ground level by four structural steel legs.

The new Sand Filter was installed to replace an existing rubber-lined carbon steel filter vessel of essentially identical capacity and design. The existing filter was replaced because it had reached the end of its reliable service life. Since the configuration of the original and replacement filters is essentially identical, it was not necessary to change any of the waste system piping or other ancillary equipment in order to install the replacement filter. The only dimensional change made in the new filter is that the top manway was increased from 18-inch diameter to 24-inch diameter to improve safety for personnel working inside the vessel while performing

I. COMPONENT DESCRIPTION (Continued)

required maintenance or inspection activities. The new filter vessel was constructed of stainless steel to increase its service life.

The scope of this report is limited to design and integrity assessments in accordance with 40 CFR 264.192 and LAC 33:V. 1905 for the replacement WWCB Secondary Sand filter.

II. DESIGN ASSESSMENTA. Design Standards

Design documentation provided by American Cyanamid is included in Appendix A of this report. Documentation of the design review and assessments performed is also included in the Appendix. In summary, an assessment was made of the design standards to which the new components were constructed. This assessment indicated that:

1. The design and construction of the replacement WWCB Secondary Sand Filter appears to be in compliance with the requirements of Section VIII of the ASME Boiler and Pressure Vessel Code; and
2. The tank and tank anchorage design appears to meet the wind load resistance requirements of ANSI A 58.1 "Minimum Design Loads in Buildings and Other Structures";
3. That the above standards are appropriate for this service.

B. Hazardous Characteristics of the Waste

The waste handled by the Secondary Sand Filter is a wastewater stream resulting from the manufacture of acrylonitrile. The EPA hazardous waste number for this material is K011. The EPA Hazard Codes for this material are Reactive and Toxic (R and T). Additional waste data provided by American Cyanamid is included in the Appendix to this report.

C. Corrosion Protection and Material Compatability

The replacement Secondary Sand Filter is located aboveground and is not in continuous contact with soil or groundwater. The exterior of the vessel is protected from corrosion by the stainless steel material of construction. Review of the waste composition and past experience at this plant has shown the waste to be compatible with and not corrosive to the vessel material of construction. In summary, a review of the corrosion protection measures and materials of construction used show them to be satisfactory for the service.

D. Other Design Considerations

1. Foundation

The replacement Secondary Sand Filter is supported by the same reinforced concrete foundation as the original Secondary Sand Filter. Since the foundation provided several years of satisfactory support for the original vessel and the weight of the replacement filter is essentially the same as that of the original, the foundation should provide satisfactory support for the replacement filter.

2. Vessel Structural Support and Anchorage

Review of the replacement Secondary Sand Filter steel support leg design indicates that the legs should provide satisfactory support for the full weight of the tank and its contents. Review of the vessel anchorage design also indicates that the filter will not be subject to tipping or other motion resulting from wind forces in accordance with ANSI A58.1 requirements. Since the vessel bottom is elevated more than two feet above the vault floor, the filter will not be subject to flotation by a 25-year 24-hour rainfall (approximately 10.5 inches per Weather Bureau Technical Paper No. 40). Experience with similar foundations shows that frost heave effects are not significant in the New Orleans area. ANSI A58.1 also does not specify any special seismic design code requirements for this area. In summary, the Secondary Sand Filter structural support and anchorage appear satisfactory for the service.

3. Vessel Structural Strength and Seams

The design of the replacement Secondary Sand Filter appears to provide structural strength and seams in compliance with the requirements of Section VIII of the ASME Boiler and Pressure Vessel Code. Calculations and a review of the vessel design are included in the Appendix to this report.

4. Connections

Review of the design of the nozzle-to-tank connections shows that the designs used appear to be in compliance with the requirements of Section VIII of the ASME Boiler and Pressure Vessel Code. The piping and ancillary equipment

4. Connections (Continued)

connections and flanges also appear to be in compliance with ANSI B31.3 requirements for the service.

5. Pressure and Overfill Controls

The replacement Secondary Sand Filter is a pressure vessel designed for 100 psig operating pressure. It is protected from overpressure by a relief valve attached to the filter inlet piping. The filter is sealed and designed to operate full of liquid, so it is not subject to spills caused by overfilling.

6. Ancillary Equipment

No changes were made in the existing system ancillary equipment as part of this project.

III. INSTALLATION INSPECTION

After installation the replacement Secondary Sand Filter was inspected for compliance with the design documentation and evidence of weld breaks, punctures, scrapes of protective coatings, cracks, corrosion, and other structural damage or inadequate construction or installation. The vessel wall thickness was also verified by ultrasonic thickness measurements. Documentation of the inspection performed is included in the Appendix to this report. The installation was found to be in accordance with the design documentation. No evidence of significant defects, damage, or evidence of improper construction or installation was found.

IV. TIGHTNESS TESTING

The replacement Secondary Sand Filter was tested for tightness prior to being placed in service. Tightness testing consisted of hydrostatic testing of the replacement filter at the fabrication shop and operational leak testing following installation. Documentation of the testing performed is included in the Appendix. There was no evidence of leakage from the replacement Sand Filter during either tightness test.

V. CONCLUSIONS OF ASSESSMENTS AND TESTING

Based on the information presented above and in the Appendix to this report, it appears that the replacement WWCB Secondary Sand Filter installed at the American Cyanamid Fortier Plant in Westwego, Louisiana is adequately designed, has sufficient structural strength and support, and is sufficiently compatible with the waste to be stored to prevent collapse, rupture, or failure if operated in its current condition and service. Post-installation inspection did not disclose any evidence of improper installation or damage to the replacement filter. There was also no evidence of leakage from the replacement filter during tightness testing.

APPENDIX A
Design and Assessment Documentation

APPENDIX A
TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
LDEQ Letter to H.T. Thurber dated May 8, 1989.....	A- 1
Albach/Cembell Secondary Sand Filter Drwg C-1820 Rev.4.....	A- 3
ASME form U-1A Inspection Certificate dated 10-05-89.....	A- 5
ASME form U-4 Dated 10-05-89.....	A- 6
Cembel Photocopy of vessel nameplate.....	A- 7
Cembel "CodeCalc" ASME calculations dated June 23, 1989.....	A- 8
Cyanamid Waste Reference Report dated 04-07-88.....	A-13
Cyanamid "Injected Waste Analysis" memo dated 04-04-89.....	A-15
TERA Sand Filter Review Calculations.....	A-19
Cembel Hydrotest Log dated 09-25-89.....	A-22
TERA Tank/Drum Inspection Record dated 01-26-90.....	A-23
TERA Thickness Measurement Record dated 01-26-90.....	A-24
TERA Leak Test Record dated 01-24-90.....	A-25



State of Louisiana
Department of Environmental Quality



BUDDY ROEMER
Governor

PAUL TEMPLET
Secretary

May 8, 1989

Copy: *P. White*
P. Davis
C. Dandridge

CERTIFIED-RETURN RECEIPT REQUESTED (P 817 071 091)

Mr. H.T. Thurber
American Cyanamid Company
Fortier Plant
LAD 008175390
10800 River Road
Westwego, Louisiana 70094

Re: "WWCB Pretreatment System" Filter Replacement

Dear Mr. Thurber:

The Louisiana Department of Environmental Quality-Hazardous Waste Division (LDEQ-HWD) is in receipt of your February 20, 1989, letter in which you requested permission to replace and upgrade an existing sand filter in the "WWCB Pretreatment System." You also requested closure of the existing filter in accordance with the July 7, 1988 Closure Plan submitted by American Cyanamid to comply with LAC 33:V.1915.

The LDEQ-HWD has reviewed your letter and based on the information submitted, hereby grants your request to replace and upgrade a secondary sand filter in the "WWCB Pretreatment System" provided there is no increase in total existing capacity; the only change in the process consists of filter replacement to be identical to the existing filter except that the material of construction will be stainless steel; and all construction and design specifications will be as described by American Cyanamid in the Hazardous Waste Permit Application. Certification in accordance with LAC 33:V.1905 must be submitted to LDEQ-HWD.

The LDEQ-HWD hereby grants permission to close the existing sand filter in accordance with the July 7, 1988 Closure Plan submitted by American Cyanamid. This filter will be closed by decontamination. Legal notice of the closure will be published by the Department.

OFFICE OF SOLID AND HAZARDOUS WASTE P.O. BOX 44307 BATON ROUGE, LOUISIANA 70804

AN EQUAL OPPORTUNITY EMPLOYER

H. T. THURBER
MAY 12 1989

American Cyanamid
Page Two

If you have any questions, please contact Gail Artall or J.
P. Meyers at (504) 342-4685.

Sincerely,


GLENN A. MILLER, Administrator
Hazardous Waste Division

GAM:GBA:jal

cc: Mr. Timothy Hardy, Assist Secretary
Office of Solid & Hazardous Waste

TOLERANCES (UNLESS OTHERWISE NOTED) LINEAR DIMENSIONS: $\pm 1/16$ " ANGLES: $\pm 1/2^\circ$ FLANGE HOLE STRADDLE: $\pm 1/16$ " FROM LEVEL NOZZLE LOCATIONS: $\pm 1/16$ "			
A.	B.	C.	D.
E.	F.	G.	H.
I.	J.	K.	L.
M.	N.	O.	P.

SCHEDULE OF OPENINGS :										
NAME	GRADE	AGE	HEIGHT	TYPE	SPRINGS	WATER	DEPTH	TEMP.	ANAL.	USE
A	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
B	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
C	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
D	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
E	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
F	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
G	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
H	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
I	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
J	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
K	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
L	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
M	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
N	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
O	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
P	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
Q	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
R	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
S	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
T	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
U	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
V	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
W	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
X	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
Y	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E
Z	1	6'	50 lb	11-2	WATER	11 E	11 E	11 E	11 E	11 E

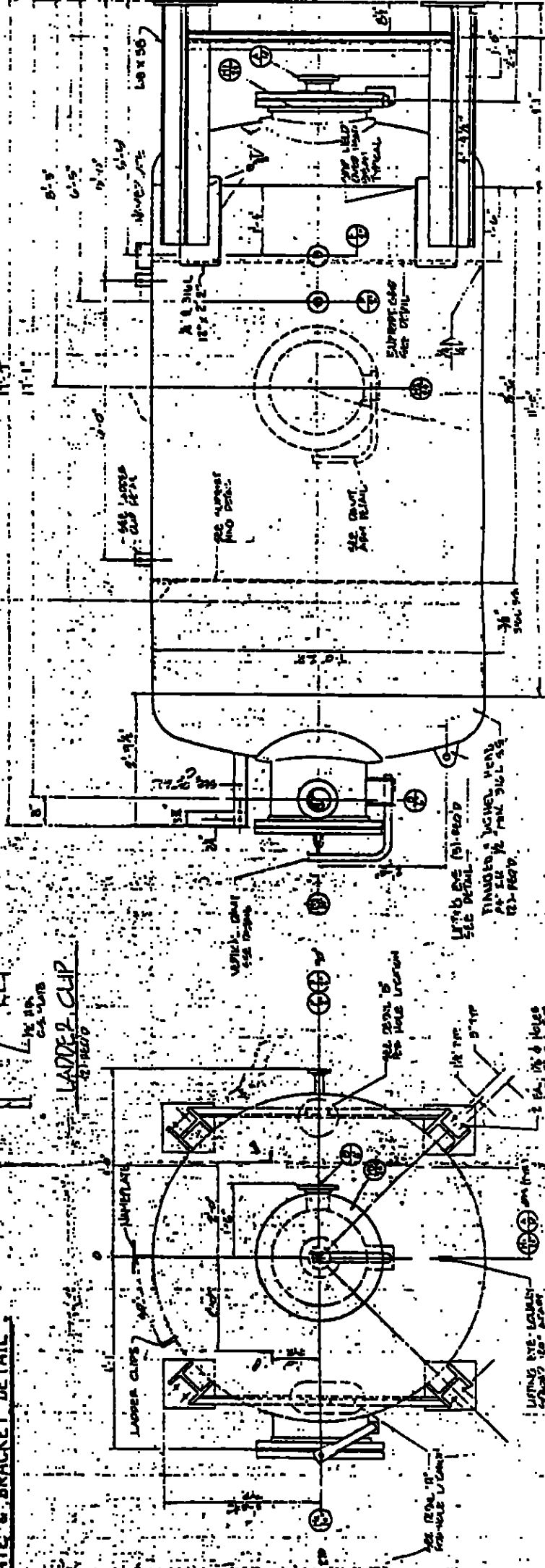
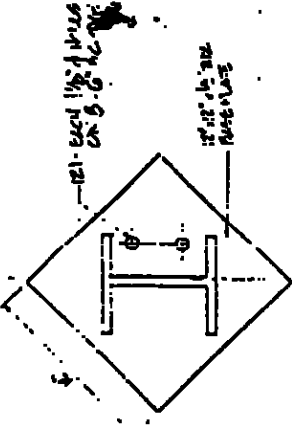
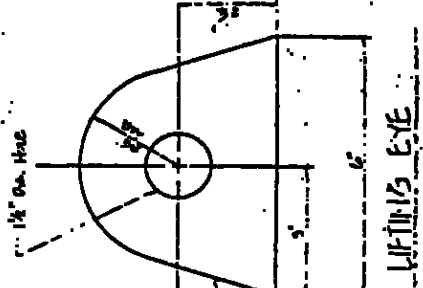
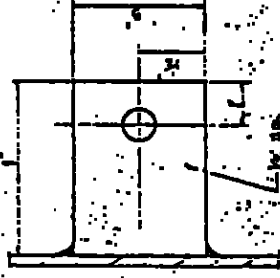
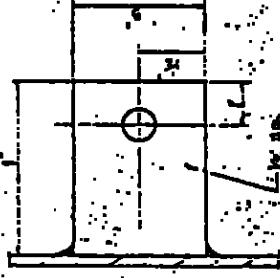
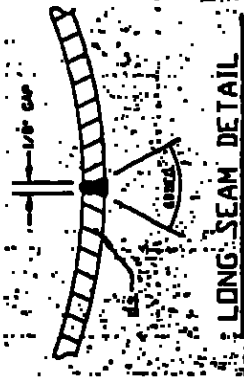
[illegible]

APPROVED FOR
CONSTRUCTION

THE ALBACH CO.
AT CEMPELL IND.

P.O. BOX 1159 · CHALMETTE, LA

REVISIONS		PROJECT
1	9/20	PROJECT
2	6-1	6-1
3	7/7	7/7
4	9/2	9/2



ORIENTATION

FORM U-1A MANUFACTURERS' DATA REPORT FOR PRESSURE VESSELS
(Alternate Form for Single Chamber, Completely Shop-Fabricated Vessels Only)
as required by the provisions of the ASME Code rules, Section VIII, Division 1

A-5

1. Manufactured and certified by Cembell Industries, Inc. 5417 Paris Rd. Chalmette, La.
(name and address of manufacturer)

2. Manufactured for American Cyanamid 10800 River Rd. Westwego, La.
(name and address of purchaser)

3. Location of installation American Cyanamid 10800 River Rd. Westwego, La.
(name and address)

4. Type: Vertical 1820-89-0238 C-1820 94 1989
(type or vert. tank) (MFA serial no.) (CRN) (drawing no.) (Mat'l. Bd. no.) (year built)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction and workmanship conform to ASME Code, Section VIII, Division 1: 1986
A88 (year)

6. Shell: SA240T316L 3/8" None 7'0" I.D. 11'0" Seam/Seam
(Mat'l. (spec. no., grade)) (nom. thickness (in.)) (COR & ROW (in.)) (I.D. (ft. & in.)) (length (feet)) (ft. & in.)

7. Seams: Dbt. butt Full 100% Dbt. butt Full 2
(type welded, dbt., sing. lap, butt) (RT, spot or full) (eff. (%)) (RT, spot or full) (type welded, dbt., sing. lap, butt) (RT, spot or full) (no. of courses)

8. Heads: (a) SA240T316L (b) SA240T316L
(Mat'l. (spec. no., grade)) (Mat'l. (spec. no., grade))

	Location (top, bottom, ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knockout Radius	E. J. Ca. Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (convex or concave)
(a)	Top	.5"	None	84"	5.125"					Concave
(b)	Bottom	.5"	"	84"	5.125"					Concave

If removable, bolts used (describe other fastenings):

9. MAWP: 100 at max. temp. 200 Min design metal temp. 0 F at 100 Hydro. XXXXXXX test pressure 150
(psa) (°F) (°F) (psa) (type of test) (psa)

10. Nozzles, inspection and safety valve openings:

Purpose (vent, drain, etc.)	No.	Size or Size	Type	Mat'l.	Nom. Thickness	Reinforcement Mat'l.	How Attached	Location

11. Supports: Skin No Lugs 4 Other Attached Weld/Shell
(yes or no) (no.) (type) (where & how)

12. Remarks: Manufacturers' Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: Vessel is a Waste Water Secondary Sand Filter.
(name of partial report, number, date and identifying stamp)

Charpy Impact Tests not required as per FC 20.
Nozzle "F" is the safety relief valve outlet.

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. "U" Certificate of Authorization no. 9818 expires 9 19 92
Date 10/5/89 Name Cembell Industries, Inc. Signed Mary Bunka
(manufacturer) (representative)

CERTIFICATE OF SHOP INSPECTION

Vessel constructed by Cembell Industries, Inc. at 5417 Paris Rd. Chalmette, La.
I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the state or province of Louisiana and employed by Department of Public Safety of Louisiana have inspected the component described in this Manufacturers' Data Report on 9-25-89 and state that, to the best of my knowledge and belief, the manufacturer has constructed this pressure vessel in accordance with the ASME Code Section VIII, Division 1. By signing this certificate neither the inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in the Manufacturers' Data Report. Furthermore, neither the inspector nor his employer shall be liable in any manner for any personal injury or property damage or loss of any kind arising from or connected with this inspection.
Date 10-5 19 89 Signed Clayton E. Baker Commission NB5310 LA441
(authorized inspector) (Mat'l. Bd. (incl. endorsements) state, prov. and no.)

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

A-6

Manufactured and certified by Cembell Industries, Inc. 5417 Paris Rd. Chalmette, La.

Manufactured for American Cyanamid 10800 River Rd. Westwego, La.

1. Location of Installation American Cyanamid 10800 River Rd. Westwego, La.

Type Vertical 1820-89-0238 C-1820 94 1989

Date Report

Item Number

Remarks

Item #10.)

Purpose	No.	Dia. or Size	Type	Mat'l	Nom. Thk.	Reinf. Mat'l	How Attach	Location
Inlet	1	6"	Pipe	SA312316L	.28"	SA240T316L	Weld	Nozzle M1
Outlet	1	6"	"	"	.28"	None	"	Nozzle M3
Manway	1	24"	Plate	SA240316L	.25"	SA240T316L	"	Bottom Head
Manway	1	24"	Plate	"	.25"	"	"	Shell
Manway	1	24"	"	"	.25"	"	"	Top Head
Vent	1	2"	Pipe	SA312316L	.154"	None	"	Shell
Pressure	1	2"	"	"	.154"	"	"	Shell

All flanges-150#. R.F.S.O.. SA312316L material.

Co. name Cembell Industries Inc. Signed Mary Bursbacher

Signed Claude E. Carls

Commission NB5310 LA441

NATIONAL BOARD NO. 92

CERTIFIED

CENTRIFUGAL PUMP INDUSTRY INC.

5417 F. H. BIRD. G. WHITE, LA.

CUSTOMER: AMERICAN CYANAMIDE

SERIAL NO. 8120-89-0212

M.A.W.P. 100 200

M.A.W.P. BY: DESIGN

M.D.M.T. 0 100

SHELL 10 1/2 IN.

SHELL 15 MPH

C.A. TEST 150

DATE TESTED 3/2/83

WASTEWATER SAND FILTER

BUILT: 1983

CodeCalc (TM) - Design and Analysis of Vessels and Exchangers. VER 3.1
 ASME Code, Section VIII, Div. 1, Components under INTERNAL Pressure

NOTES

Vessel : AMERICAN CYANAMID ACRYLONITRILE WASTE WATER FILTER
 Component: JOB # C-182D
 Engineer : LARRY ANTONINI
 Date, Time: 23-Jun-89 03:02 PM

FILE NAME : SHELL

Design Pressure, psi P 100.0 (1)
 Design Temperature, Deg F TEMP 200.0

Material MATYPE SS316L, HI (2)
 Allowable Stress if Material is not in tables: ALTSTR 0
 Ambient Stress if Material is not in tables: AMBSTR 0
 Shell or Head Type: (Enter at least 4 letters) TYPE CYLINDER (3)
 Cylindrical Shell UG-27 (1) or App 1-1 (1)
 Elliptical Head UG-32 (1) or App 1-4 (c) (2)
 Torispherical Head UG-32 (2) or App 1-4 (d) (4)
 Spherical Head or Shell UG-27 (3) or App 1-1 (2)

Diameter or Crown Radius, in. D 84.000
 Diameter Basis, Enter ID or OD BASIS ID (4)

Actual Thickness, in. T 0.375
 Corrosion Allowance, in. CA 0.000 (5)

Joint Efficiency E 1.00 (6)

Aspect ratio (D/2h) for elliptical heads, in. AR 2.000 (7)
 Knuckle ratio (L/r) for torispherical heads, in. LR 0.000

Allowable Stress Used in Calculation, psi S 16700
 Allowable Stress at Ambient Temperature, psi SA 16700 (8)

REQUIRED THICKNESS BASED ON DESIGN PRESSURE, IN. 0.252

$$= (P * (D/2 + CA)) / (S * E - 0.6 * P)$$

$$= (100.0 * (84.000/2 + 0.000)) / (16700 * 1.00 - 0.6 * 100.0)$$

 Required thickness, including corrosion allowance, in. 0.252
 Given thickness, as entered above, in. 0.375

M.A.W.P BASED ON GIVEN THICKNESS, CORRODED, PSI 148

$$= (S * E * (T - CA)) / ((D/2 + CA) + 0.6 * (T - CA))$$

$$= (16700 * 1.00 * (0.375 - 0.000)) / ((84.000/2 + 0.000) + 0.6 * (0.375 - 0.000))$$

 Design Pressure, as entered above, psi 100

M.A.W.P., NEW (UNCORRODED) AND COLD (70 F), PSI 148

$$= (SA * E * T) / ((D/2) + 0.6 * (T))$$

$$= (16700 * 1.00 * 0.375) / ((84.000/2) + 0.6 * (0.375))$$

 Hydrotest Pressure Based on MAWP, per UG-99 (b), psi 222 (9)
 Actual stress, corroded thickness, design pressure, psi 11260

Head

A-9

CodeCalc (TM) - Design and Analysis of Vessels and Exchangers. VER 3.1
 ASME Code, Section VIII, Div. 1, Components under INTERNAL Pressure
 NOTES

Vessel : AMERICAN CYANAMID ACRYLONITRILE WASTE WATER FILTER
 Component: JOB C-1829
 Engineer : LARRY ANTONINI
 Date, Time: 23-Jun-89 03:21 PM

FILE NAME : HEAD

Design Pressure, psi P 100.0 (1)
 Design Temperature, Deg F TEMP 200.0

Material MATYPE SS316L, HI (2)
 Allowable Stress if Material is not in tables: ALTSTR 0
 Ambient Stress if Material is not in tables: AMBSTR 0
 Shell or Head Type: (Enter at least 4 letters) TYPE ELLIPTICAL (3)
 Cylindrical Shell UG-27 (1) or App 1-1 (1)
 Elliptical Head UG-32 (1) or App 1-4 (c) (2)
 Torispherical Head UG-32 (2) or App 1-4 (d) (4)
 Spherical Head or Shell UG-27 (3) or App 1-1 (2)

Diameter or Crown Radius, in. D 84.000
 Diameter Basis, Enter ID or OD BASIS ID (4)

Actual Thickness, in. T 0.438
 Corrosion Allowance, in. CA 0.000 (5)

Joint Efficiency E 1.00 (6)

Aspect ratio (D/2h) for elliptical heads, in. AR 2.000 (7)
 Knuckle ratio (L/r) for torispherical heads, in. LR 0.000

Allowable Stress Used in Calculation, psi S 16700
 Allowable Stress at Ambient Temperature, psi SA 16700 (8)

REQUIRED THICKNESS BASED ON DESIGN PRESSURE, IN. 0.252

$= (P * (D + 2 * CA) * K) / (2 * S * E - 0.2 * P)$

$= (100.0 * (84.000 + 2 * 0.000) * 1.00) / (2 * 16700 * 1.00 - 0.2 * 100.0)$

Required thickness, including corrosion allowance, in. 0.252

Given thickness, as entered above, in. 0.438

M.A.W.P BASED ON GIVEN THICKNESS, CORRODED, PSI 174

$= (2 * S * E * (T - CA)) / (K * (D + 2 * CA) + 0.2 * (T - CA))$

$= (2 * 16700 * 1.00 * (0.438 - 0.000)) / (1.00 * (84.000 + 2 * 0.000) + 0.2 * (0.438 - 0.000))$

Design Pressure, as entered above, psi 100

M.A.W.F., NEW (UNCORRODED) AND COLD (70 F), PSI 174

$= (2 * SA * E * T) / (K * D + 0.2 * T)$

$= (2 * 16700 * 1.00 * 0.438) / (1.00 * 84.000 + 0.2 * 0.438)$

Hydrotest Pressure Based on MAWP, per UG-99 (b), psi 261 (9)

Actual stress, corroded thickness, design pressure, psi 9610

CodeCalc (TM) - Design and Analysis of Vessels and Exchangers. VER 3.1
ASME Code, Section VIII, Div. 1, Nozzle Reinforcement Calculations

NOTES

Vessel : AMERICAN CYANAMID ACRYLONITRILE WASTE WATER FILTER
Component: JOB C-1829
Engineer : LARRY ANTONINI
Date, Time: 23-Jun-89 03:24 PM

FILE NAME : MANWAY M1

Shell or Head Type: (Enter at least 4 letters) TYPE ELLIPTICAL
Cylindrical Shell UG-27 (1) or App 1-1 (1) (1)
Elliptical Head (2:1) UG-32 (1) or App 1-4 (c) (2)
Torispherical Head UG-32 (2) or App 1-4 (d) (4)
Spherical Head or Shell UG-27 (3) or App 1-1 (2)

Design Pressure, Psi P 100.0
Design Temperature TEMP 200.0

Angle between Nozzle and Shell (typically 90), deg 90

Nozzle Diameter and Thickness Basis. Actual (2)
(Actual, Nominal, or Minimum)

	Shell	Nozzle	
Diameter or crown radius, in. D	84.000	24.000	(3)
Diameter basis, enter ID or OD ID OD			
Actual thickness, in. T	0.438	0.375	
Required thickness, in. (calculated if 0.0)	0.252	0.000	
Corrosion allowance, mill tolerance, in. CA	0.000	0.000	(4)
Material	SS316L, HISS316L, HI		
Allowable stress if material is not in tables:	0	0	(5)
Seam efficiency (< 1 if nozzle is in seam)	ES	1.000	
Nozzle outside weld leg size, in. OW		0.375	
Nozzle inside projection, in. H		0.000	
Nozzle inside weld leg size, in. IW		0.000	

Class of attached flange (for B16.5) CLASS CL 150
Grade of Flange Material (for B16.5) GRADE GR 2.1

Pad outside diameter along vessel surface, in. DP	26.000	(6)
Pad thickness, in. TP	0.375	
Pad weld leg size, in. WP	0.313	
Pad material	MAT3 SS316L, HI	
Allowable stress if material is not in tables: ALTSTR3	0	

Physical maximum for nozzle diameter limit, in. DMAX	0.000
Physical maximum for nozzle thickness limit, in. TMAX	0.000

Shell allowable stress used in calculation, psi S	16700
Nozzle allowable stress used in calculation, psi SN	16700
Pad allowable stress used in calculation, psi SP	16700

Nozzle Thickness used in calculation, in. TN	0.375
Nozzle Diameter used in calculation, in. DN	24.000
Pad maximum diameter limit, in. DL	46.500
Pad maximum thickness limit, in. TL	1.095

Required shell thickness, tr, in. TR	0.252
Maximum allowable working pressure, shell, psi MAWP	174
Required nozzle thickness, trn, in. TRN	0.072
Maximum allowable working pressure, nozzle, psi MAWPN	528

AREA REQUIRED, A, sq. in. AR	5.859
------------------------------	-------

Area available in shell, A1, sq. in. A1	4.325
Area available in nozzle, A2, sq. in. A2	0.569
Area available in inside projection, A3, sq. in. A3	0.000
Area available in welds, A4, sq. in. A4	0.141
AREA AVAILABLE WITHOUT PAD, sq. in.	5.034

Area available in pad, A5, sq. in. A5	0.730
Weld area, A4, including pad weld, sq. in. A4	0.238
Modified area available in nozzle, A2, sq. in. A2	0.664
AREA AVAILABLE WITH PAD, sq. in.	5.977

Pad thickness needed, based on given diameter, in.	0.316	(8)
Pad diameter needed, based on given thickness, in.	25.685	
M.A.W.P. taking full credit for A1 and A2 per Code, psi	112.2	(9)
M.A.W.P. of B16.5 Flange at design temperature, psi	235.0	

Percent of Reinforcement within Large Nozzle limits	84%	(10)
---	-----	------

Manway in shell Repad 30" o.d. x 3/8" thk A-11

CodeCalc (TM) - Design and Analysis of Vessels and Exchangers. VER 3.1
ASME Code, Section VIII, Div. 1, Nozzle Reinforcement Calculations

NOTES

Vessel : AMERICAN CYANAMID ACRYLONITRILE WASTE WATER FILTER
Component: JOB #C-182D
Engineer : LARRY ANTONINI
Date, Time: 23-Jun-89 03:08 PM

FILE NAME : MANWAY M2

Shell or Head Type: (Enter at least 4 letters) TYPE CYLINDER
Cylindrical Shell UG-27 (1) or App 1-1 (1) (1)
Elliptical Head (2:1) UG-32 (1) or App 1-4 (c) (2)
Torispherical Head UG-32 (2) or App 1-4 (d) (4)
Spherical Head or Shell UG-27 (3) or App 1-1 (2)

Design Pressure, Psi P 100.0
Design Temperature TEMP 200.0

Angle between Nozzle and Shell (typically 90), deg 90

Nozzle Diameter and Thickness Basis. Actual (2)
(Actual, Nominal, or Minimum)

	Shell	Nozzle	
Diameter or crown radius, in. D	84.000	24.000	(3)
Diameter basis, enter ID or OD ID OD			
Actual thickness, in. T	0.375	0.375	
Required thickness, in. (calculated if 0.0)	0.252	0.000	
Corrosion allowance, mill tolerance, in. CA	0.000	0.000	(4)
Material	SS316L, HI	SS316L, HI	
Allowable stress if material is not in tables: S	0	0	(5)
Seam efficiency (< 1 if nozzle is in seam) ES	1.000		
Nozzle outside weld leg size, in. DN	0.375		
Nozzle inside projection, in. H	0.000		
Nozzle inside weld leg size, in. IW	0.000		

Class of attached flange (for B16.5) CLASS CL 150
Grade of Flange Material (for B16.5) GRADE GR 2.1

Pad outside diameter along vessel surface, in. DP	30.000	(6)
Pad thickness, in. TP	0.375	
Pad weld leg size, in. WP	0.375	
Pad material MAT3	SS316L, HI	
Allowable stress if material is not in tables: ALTSTR3	0	

Physical maximum for nozzle diameter limit, in. DMAX 0.000
Physical maximum for nozzle thickness limit, in. TMAX 0.000

Shell allowable stress used in calculation, psi S 16700
Nozzle allowable stress used in calculation, psi SN 16700
Pad allowable stress used in calculation, psi SP 16700

Nozzle Thickness used in calculation, in. TN 0.375
Nozzle Diameter used in calculation, in. DN 24.000
Pad maximum diameter limit, in. DL 46.500
Pad maximum thickness limit, in. TL 0.938

Required shell thickness, tr, in. TR 0.252
Maximum allowable working pressure, shell, psi MAWP 148
Required nozzle thickness, trn, in. TRN 0.072
Maximum allowable working pressure, nozzle, psi MAWPN 528

AREA REQUIRED, A, sq. in. AR 5.859

Area available in shell, A1, sq. in. A1 2.860
Area available in nozzle, A2, sq. in. A2 0.569
Area available in inside projection, A3, sq. in. A3 0.000
Area available in welds, A4, sq. in. A4 0.141
AREA AVAILABLE WITHOUT PAD, sq. in. 3.569

Area available in pad, A5, sq. in. A5 2.250
Weld area, A4, including pad weld, sq. in. A4 0.281
Modified area available in nozzle, A2, sq. in. A2 0.569
AREA AVAILABLE WITH PAD, sq. in. 5.960 (7)

Pad thickness needed, based on given diameter, in. 0.358 (8)
Pad diameter needed, based on given thickness, in. 29.731
M.A.W.P. taking full credit for A1 and A2 per Code, psi 100.7 (9)
M.A.W.P. of B16.5 Flange at design temperature, psi 235.0

Percent of Reinforcement within Large Nozzle limits 90% (10)

CodeCalc (TM) - Design and Analysis of Vessels and Exchangers. VER 3.1
 ASME Code, Section VIII, Div. 1, Nozzle Reinforcement Calculations

NOTES

Vessel : AMERICAN CYANAMID ACRYLONITRILE WASTE WATER FILTER
 Component: JOB #C-182D
 Engineer : LARRY ANTONINI
 Date, Time: 23-Jun-89 03:13 PM

FILE NAME : NOZZLE B

Shell or Head Type: (Enter at least 4 letters) TYPE CYLINDER
 Cylindrical Shell UG-27 (1) or App 1-1 (1) (1)
 Elliptical Head (2:1) UG-32 (1) or App 1-4 (a) (2)
 Torispherical Head UG-32 (2) or App 1-4 (d) (4)
 Spherical Head or Shell UG-27 (3) or App 1-1 (2)

Design Pressure, Psi P 100.0
 Design Temperature TEMP 200.0

Angle between Nozzle and Shell (typically 90), deg 90

Nozzle Diameter and Thickness Basis. Actual (2)
 (Actual, Nominal, or Minimum)

		Shell	Nozzle	
Diameter or crown radius, in.	D	84.000	6.625	(3)
Diameter basis, enter ID or OD	ID OD			
Actual thickness, in.	T	0.375	0.280	
Required thickness, in. (calculated if 0.0)		0.252	0.000	
Corrosion allowance, mill tolerance, in.	CA	0.000	0.000	(4)
Material		SS316L, HI	SS316L, HI	
Allowable stress if material is not in tables:		0	0	(5)
Seam efficiency (< 1 if nozzle is in seam)	ES		1.000	

Nozzle outside weld leg size, in.	OW	0.375
Nozzle inside projection, in.	H	0.500
Nozzle inside weld leg size, in.	IW	0.313

Class of attached flange (for B16.5)	CLASS	CL 150
Grade of Flange Material (for B16.5)	GRADE	GR 2.1

Pad outside diameter along vessel surface, in.	DP	0.000	(6)
Pad thickness, in.	TP	0.000	
Pad weld leg size, in.	WP	0.000	
Pad material	MAT3	SS316L, HI	
Allowable stress if material is not in tables:	ALTSTR3	0	

Physical maximum for nozzle diameter limit, in.	DMAX	0.000
Physical maximum for nozzle thickness limit, in.	TMAX	0.000

Shell allowable stress used in calculation, psi	S	16700
Nozzle allowable stress used in calculation, psi	SN	16700
Pad allowable stress used in calculation, psi	SP	16700

Nozzle Thickness used in calculation, in.	TN	0.280
Nozzle Diameter used in calculation, in.	DN	6.625
Pad maximum diameter limit, in.	DL	12.130
Pad maximum thickness limit, in.	TL	0.700

Required shell thickness, tr, in.	TR	0.252
Maximum allowable working pressure, shell, psi	MAWP	148
Required nozzle thickness, trn, in.	TRN	0.020
Maximum allowable working pressure, nozzle, psi	MAWPN	1461

AREA REQUIRED, A, sq. in.	AR	1.528
---------------------------	----	-------

Area available in shell, A1, sq. in.	A1	0.746
Area available in nozzle, A2, sq. in.	A2	0.364
Area available in inside projection, A3, sq. in.	A3	0.280
Area available in welds, A4, sq. in.	A4	0.239
AREA AVAILABLE WITHOUT PAD, sq. in.		1.629

Area available in pad, A5, sq. in.	A5	No Pad
Weld area, A4, including pad weld, sq. in.	A4	0.239
Modified area available in nozzle, A2, sq. in.	A2	0.364
AREA AVAILABLE WITH PAD, sq. in.		1.629

Pad thickness needed, based on given diameter, in.		No Calc	(8)
Pad diameter needed, based on given thickness, in.		No Calc	
M.A.W.P. taking full credit for A1 and A2 per Code, psi		103.1	(9)
M.A.W.P. of B16.5 Flange at design temperature, psi		235.0	

Percent of Reinforcement within Large Nozzle limits		94%	(10)
---	--	-----	------

REPORT DATE 07/15/88

PLANT: FORTIER

WASTE: 030285-01 INJECTION STREAM FROM WASTE WATER COLUMN BOTTOMS SYSTEM

DEPARTMENT: 62000 ACRYLONITRILE CREATION DATE: 02/25/1988 LAST UPDATE DATE: 04/07/1988

PROCESS: 62000002MAN/HCU DEEPWELL FILTRATION

DOT SHIPPING: HML HAZARDOUS WASTE, LIQUID, H.O.S. HAZARD CLASS: ORN-E UN/NA NO.: NA9183

CLASSIFICATION - RCRA HAZARDOUS PESTICIDE MFG: N EP TOXICITY: N CONTAINS PCB: N

GENERAL DETAILS - RECOVERY/RECLAIM: N SUB TO 40 CFR: Y B/B FUEL: N

APPEARANCE AND ODOR: BROWN LIQUID WITH STRONG PUNGENT ODOR

HAZARD CLASS DESCRIPTION

15 ORN-E

WASTE STATE: L DOT CORROSIVE: ST FREE LIQUID: WEIGHT: 3% LAYERS: 1

PHYSICAL PROPERTIES

PROPERTY	STATUS	PREF	FROM	VALUE	TO	COMMENTS	CONFID
----------	--------	------	------	-------	----	----------	--------

PH: 4 6
SPEC GRAVITY: 1.03 1.06
BTU CONTENT: NOT KNOWN
ASH CONTENT: 8 16 2 WEIGHT
FLASHPOINT: 200F
WATER SOL: COMPLETE
METHOD: CLOSED CUP

STABILITY
Y CYANIDES/SULFIDES
HAZARD MATERIAL
N PYROPHORIC
N ICHITABLE SOLID

ORT ... -01
REPORT DATE: 07/15/88

STE EREPO

PLANT: FORTIER

WASTE: 030285-01 INJECTION STREAM FROM WASTE WATER COLUMN BOTTOMS SYSTEM

COMPONENT CAS NO PRE FROM PRE TO UOM CONCENTRATION X CHEMICAL COMPONENT NAME

57-12-3	U	400	U	600	PPH	CYANIDES (CATION PROBABLY SODIUM)
67-56-1	U	50	U	200	PPH	METHANOL
67-64-1	U	0	U	5	PPH	ACETONE
75-05-8	U	400	U	3000	PPH	ACETONITRILE
75-86-5	U	2000	U	3000	PPH	ACETONE CYANOHYDRIN
79-06-1	U	200	U	1000	PPH	ACRYLAMIDE
79-10-7	U	.5	U	1.5	PCT	ACRYLIC ACID
80-62-6	U	0	U	1	PPH	METHYL METHACRYLATE
107-02-8	U	0	U	1500	PPH	ACROLEIN
107-13-1	U	50	U	1000	PPH	ACRYLONITRILE
1336-21-6	U	1	U	3	PCT	AMMONIUM HYDROXIDE
7732-18-5	U	90	U	99.9	PCT	WATER
A55555-06-2	U	0	U	1	PPH	TRACE ORGANICS

HAZARDOUS WASTE NUMBERS - - - -
STATE NUMBER DESCRIPTION

K011 BOTTOM STREAM/
ACRYLONITRILE(SEE
CFR 40 PART 261)

To: F. R. Whiteley

Date: April 4, 1989

Location: Fortier

Copy to: J. Johnson

From: V. Diaz

A. Junker

Location: Fortier

P. Knieper

Extension: 6253

P. Savoy

J. Schnaller

B. Skeeles

J. Witherford - NA

Subject: INJECTED WASTE ANALYSIS

Reference: NB 1113-84, NB 1117-9, NB 1085-196, MS 2341-2352

SAMPLE DESCRIPTION

1. Waste Acid Composite (5 days) 02/27/89 thru 03/03/89
2. ~~Waste Water Composite (5 days) 02/27/89 thru 03/03/89~~
3. MET Tank Composite (5 days) 02/27/89 thru 03/03/89
4. NSB Composite (5 days) 02/27/89 thru 03/03/89

SAMPLE HISTORY

Comprehensive characterization and composition of these streams is necessary for environmental and tax purposes prior to deep well injection. Samples were collected under the direction of P. Savoy and applicable EPA protocol was followed as to preservation and holding time.

METHODOLOGY EMPLOYED

In all the determinations, EPA SW-846 methods were employed whenever applicable. EPA protocol for Quality Assurance was followed for these analyses. A listing of the specific methods employed is provided below:

Parameter

Method Description

Specific Gravity

Pycnometer

Total Solids

APHA Std. Methods 15th Ed. Sect. 209

Suspended Solids

APHA Std. Methods 15th Ed. Sect. 209D

Total Kjeldahl Nitrogen

APHA Std. Methods 15th Ed. Sect. 420

Ammonia Nitrogen

APHA Std. Methods 15th Ed. Sect. 417

Total Cyanide

EPA SW-846 Method 9010

Cyanide Amenable to

Chlorination

EPA SW-846 Method 9010

Cyanohydrins

Deniges-Liebig Argentometric Titration

Sulfates

APHA Std. Methods 15th Ed. Sect. 426
(gravimetric determination)

-2-

Water Content	Karl Fisher
Sulfuric Acid Content	Acid/Base Titration
ADSA	Colorimetric Analysis
Nickel	EPA SW-846 Method 7250- AA, Direct Asp.
Acrylamide	High Performance Liquid Chromatography
All other Organics	Direct Injection GC-MS, GC-FID

RESULTS

<u>Parameter</u>	<u>Waste Acid</u>	<u>Waste Water</u>	<u>MET</u>	<u>NSB</u>
Specific Gravity at:				
140°F	1.450	--	--	--
100°F	--	1.028	--	--
70°F	--	--	1.008	1.002
Total Solids, %	69.03	6.60	2.34	1.31
Suspended Solids, ppm	--	28	17	18
Total Kjeldahl Nitrogen, %	5.58	1.41	0.134	0.384
Ammonia Nitrogen as N, %	5.49	1.18	0.020	0.028
Organic Nitrogen as N, %	0.09	0.23	0.114	0.356
Total Cyanide as CN, ppm	0.01	237	694	9
Cyanide Amenable to Chlorination, ppm	--	114	680	2
Cyanohydrins as CN, ppm	--	1620	294	6
Sulfate as SO ₄ , %	55.52	3.16	0.93	0.005
Water Content by Karl Fisher, %	28.78	--	--	--
Sulfuric Acid, %	39.73	--	--	--
Total Organic Carbon (TOC), %	1.97	1.81	0.83	0.93
ADSA, %	1.58	--	--	--
Total Nickel as Ni, ppm	--	1.3	1.8	0.32
Total Molybdenum ppm		41.4	17.9	5.2

-3-

<u>Parameter</u>	<u>Waste Acid</u>	<u>Waste Water</u>	<u>MET</u>	<u>NSB</u>
Acrylamide, ppm	10	850	160	15
Acetone, ppm	101	3	289	<1
Methanol, ppm	9080	209	689	6
Benzene, ppm	<0.1	<0.1	<0.1	<0.1
Acrylonitrile, ppm	<1	339	127	3
MMA, ppm	430	<1	105	<1
Acetonitrile, ppm	<1	1200	5270	<1
Toluene, ppm	<1	<1	40	<1
Acetic Acid, ppm	144	830	220	82
Methacrylic Acid, ppm	1500	84	54	25
Acrylic Acid, ppm	--	6620	208	711
Fumaronitrile, ppm	<10	1200	27	71
Succinonitrile, ppm	<10	540	1470	4960
MAI, ppm	1500		--	--

Volatile Organics at 105°C

To determine the volatile organics, the solids obtained after drying the sample at 105°C, were redissolved in D.I. Water, diluted back up to their original volume and re-analyzed for organics. All of the organics, with the exception of acrylamide and succinonitrile were lost. These results are tabulated below:

<u>Parameter</u>	<u>Waste Acid</u>	<u>Waste Water</u>	<u>MET</u>	<u>NSB</u>
Acrylamide, ppm	<20	29	22	<10
Acetone, ppm	<10	<10	<10	<10
Methanol, ppm	<10	<10	<10	<10
Acrylonitrile, ppm	<10	<10	<10	<10
MMA, ppm	<10	<10	<10	<10
Acetonitrile, ppm	<10	<10	<10	<10
Toluene, ppm	<10	<10	<10	<10

-4-

<u>Parameter</u>	<u>Waste Acid</u>	<u>Waste Water</u>	<u>MET</u>	<u>NSB</u>
Acetic Acid, ppm	<10	<10	<10	<10
Methacrylic Acid, ppm	<10	<10	<10	<10
Acrylic Acid, ppm	<10	<10	<10	<10
Fumaronitrile, ppm	<10	<10	<10	<10
Succinonitrile, ppm	<20	24	36	163
MAI, ppm	<10	--	--	--
Calculated Organic Carbon Loss, ppm	5380	6160	4880	3330

This technique will account for the organic compounds that were measured. The organic carbon content may be higher depending on the volatility of specific compounds that were not measured and/or low molecular weight polymers or tars that may have been lost under conditions of this test.

V. Diaz
V. Diaz

VD:mkp
(040401)

SUBJECT: CYANAMID - FORTIER
SAND FILTER REVIEW
 BY: THW DATE: 3/6/90

TERA, inc.

JOB NO.: 89-152-1
 FILE: CALCULATION
 SHEET: 1 OF: 3

WWCB SECONDARY SAND FILTER REPLACEMENT

Pressure Design Review:

References: Cembell Drwg C-1820

Pressure Vessel Handbook Maughesy 7th Ed
 (ASME Code calculation methods and data)

Design Data:	Design Pressure - 100 psig	Dia. - 7'-0" id
	Design Temperature - 200 °F	S/S - 11'-0"
	Full Radiograph (E = 1.0)	ASME Heads
		$C_a = 0$

Shell Thickness Required:

$$t = \frac{PR}{SE - 0.6P}$$

$$t = \frac{100 (42)}{15700 (1.0) - 0.6 (100)}$$

$$t_{req'd} = 0.269 \text{ in}$$

P = design pressure (psig)

R = inside radius (in)
 $= \frac{84}{2} = 42"$

S = allowable stress
 $= 15.7 \text{ ksi for}$
 SA 240 TP 316 L

E = joint efficiency
 $= 1.0 \text{ for full x-ray}$

$$t_{req'd} = 0.269 \text{ in} < 0.375 = t_{actual}$$

∴ Shell thickness OK

Head Thickness Required:

For typical ASME head: 6% knuckle radius ($\frac{4}{r} = 16\frac{2}{3}$)
 $L = D - 6 \text{ in}$

SUBJECT: CYANAMID - FORTIER
SAND FILTER REVIEW
 BY: THW DATE: 3/6/90

TERA, inc.

JOB NO.: 89-152-1
 FILE: CALCULATION
 SHEET: 2 OF: 3

Head Thickness Required: (cont'd)

$$t_{req'd} = \frac{0.885 PL}{SE - 0.1 P}$$

$$t_{req'd} = \frac{0.885 (100)(34.6)}{15700 (10) - 0.1 (100)}$$

P = design pressure = 100 psia

L = Dish radius = D-6

S = allowable stress

$$= 15,700 \text{ psi } (31.6 L / 2000)$$

E = 1.0 Full x-ray / seamless

$$t_{req'd} = 0.440 \text{ in}$$

$$t_{req'd} = 0.440 < 0.500 \text{ (min)} = t_{actual}$$

\therefore Head thickness OK

Nozzles and Reinforcements:

Review of Cembell computer calculations for nozzle thickness and reinforcement indicates that design is in compliance with ASME Code requirements.

WIND LOAD / ANCHORAGE

Reference: ANSI ASB.1

$$F = q_z G_h C_f A_f$$

$$q_z = 0.000256 k_z (I V)^2$$

$$= 0.00256 (0.81) (1.05/100)^2$$

$$q_z = 22.86 \text{ lb/ft}^2$$

$$V = 100 \text{ mph (Fig. 1.)}$$

$$I = 1.05 \text{ (Cat I.; Table 5)}$$

$$k_z = 0.81 \text{ (wtd. avg for } h = 18' ; \text{ Exposure C; Table 6)}$$

$$G_h = 1.32 \text{ (wtd. avg for } h = 18' ; \text{ Exposure C; Table 7)}$$

$$C_f = 0.87 \text{ (Table 12; Very Rough; } h/D = 2.57)$$

SUBJECT: CYANAMID - FORTIER
SAND FILTER REVIEW
 BY: T.W. DATE: 3/6/90

TERA, inc.

JOB NO.: 89-152-1
 FILE: CALCULATION
 SHEET: 3 OF 3

WIND LOAD / ANCHORAGE : (cont'd)

$$F = 22.86 (1.32) (0.87) (7' \times (11 + (2 \times 1.5)))$$

$$F = 2573 \text{ lb}$$

$$M = F \left(\frac{h}{2} \right) = 2573 \left(\frac{18}{2} \right) = 23,155 \text{ ft-lb}$$

Wt. of vessel :

$$\text{Shell : } 11'-0'' \times 338 \frac{1}{4} \text{ ft} = 3718 \text{ lb} \quad (\text{PUH p 362; } \frac{3}{8}')$$

$$\text{Heads : } 2 \times 983 \text{ lb} = 1966 \text{ lb} \quad (\text{PUH p 363; } \frac{1}{2}')$$

$$\text{Legs : } 4 \times 5' \times 58 \frac{1}{4} \text{ ft} = 1160 \text{ lb}$$

$$\text{Nozzles \& misc : (est)} = 1000 \text{ lb}$$

$$\underline{7844 \text{ lb}}$$

$$M = W (R_{\text{leg}})$$

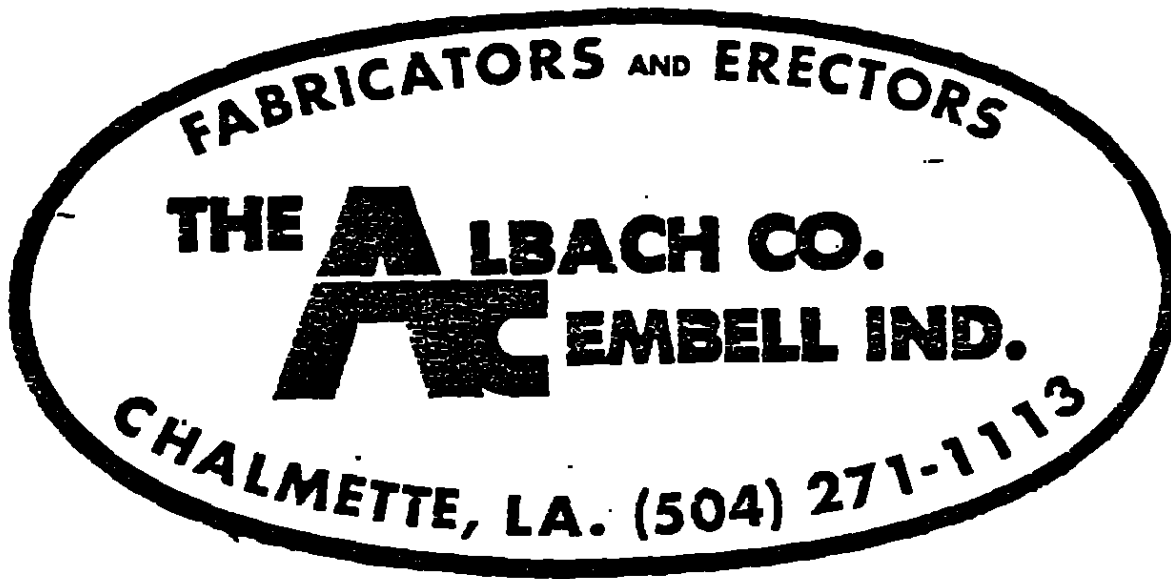
Assume : R_{leg} across 2 legs = 3'-0" (conservative)

$$M = 7844 \text{ lb} \times 3 \text{ ft} = 23532 \text{ ft-lb}$$

Weight moment = 23,532 ft-lb > 23,155 wind moment OK

\therefore Empty vessel not subject to overturning in 100mph wind.

Note: Anchorage of tank provided and weight of liquid and sand media contents add considerable margin of safety for overturning



CEMBELL INDUSTRIES

HYDROTEST LOG

Manufacturer's Job Number C-1820 S/N 1820-89-0238Vessel Diameter and Length 84" ID x 11' 0" LCustomer American CigaretteTest Pressure 150 psiDate tested 9/25/89Time tested 9 AM to 9:30 AMMechanic performing test Kit CourtneyQuality Assurance Manager witnessing test Mar. BrubakerOage ID # 766 PSI Range 0-200

TERA, INC.TANK/DRUM INSPECTION RECORD

CLIENT: American Cyanamid
 PLANT LOCATION: Westwego, Louisiana
 TYPE INSPECTION: EXTERIOR
 ITEM NO: WCB SSF CODE: ASME
 SERVICE: WCB Secondary Sand Filter
 CAPACITY: 3,600 gal TANK/DRUM TYPE: Vertical w/dished heads
 Sheet: 1 of 1
 Job No. 89-152-1
 Date: 01/26/90
 By: THW
 YEAR BUILT: 1989

	<u>TOP HEAD</u>	<u>WALL/SHELL</u>	<u>BOTTOM HEAD</u>	<u>JACKET</u>
MATLS:	316L SS	316L SS	316L SS	None
TOP HEAD CONDITION:	Satisfactory			
WALL/SHELL CONDITION:	Satisfactory			
BOTTOM HEAD CONDITION:	Satisfactory			
JACKET CONDITION:	Not applicable			
SUPPORT/FOUNDATION CONDITION:	Satisfactory			
INTERNAL STRUCTURE CONDITION:	Not applicable			
FLANGED JOINT CONDITION:	None			
NOZZLE CONDITION:	Satisfactory			
LINING/COATING CONDITION:	Exterior paint satisfactory			
INSULATION CONDITION:	Not applicable			
SAFETY VALVE CONDITION:	Visual satisfactory (on adjacent piping)			
SIGNS OF CRACKS:	None			
SIGNS OF LEAKAGE:	None			
SIGNS OF CORROSION:	None			
SIGNS OF EROSION:	None			
TEST? Yes	TYPE: Operating	RESULTS: Satisfactory		
OPERATING CONDITIONS:	MAX TEMP: 150 F	MAX PRESS: 50 psig	VAC: No	
REFERENCE INSPECTION RECORDS:	Ultrasonic thickness measurements 1/26/90			
COMMENTS:				

TERA, INC.

THICKNESS MEASUREMENT RECORDCLIENT: *AMERICAN CYANAMID*PLANT LOCATION: *WESTWEGO, LA.*COMPONENT: *REPLACEMENT WWCB SECONDARY
SAND FILTER*SHEET: *1 OF 1*JOB NO. *89-152-1*DATE: *1-26-90*BY: *T.H.W*

NOZZLES		
LOCATION	SIZE	THICKNESS
<i>BOTTOM INLET</i>	<i>6</i>	<i>.288</i>
<i>BOTTOM MANWAY</i>	<i>24</i>	<i>.283</i>
<i>SIDE MANWAY</i>	<i>24</i>	<i>.278</i>
<i>N SIDE LOWER</i>	<i>2</i>	<i>.161</i>
<i>N SIDE UPPER</i>	<i>2</i>	<i>.157</i>
<i>TOP MANWAY</i>	<i>24</i>	<i>.279</i>
<i>TOP OUTLET</i>	<i>6</i>	<i>.285</i>

SHELL AND HEADS				
LEVEL NO.	POSITION			
	N	E	S	W
<i>BOT. HD. IN.</i>	<i>.653</i>	<i>.642</i>	<i>.655</i>	<i>.647</i>
<i>BOT. HD. OUT.</i>	<i>.672</i>	<i>.659</i>	<i>.665</i>	<i>.670</i>
<i>SHELL 1:</i>				
<i>BOTTOM</i>	<i>.420</i>	<i>.419</i>	<i>.416</i>	<i>.417</i>
<i>TOP</i>			<i>.410</i>	
<i>SHELL 2:</i>				
<i>BOTTOM</i>			<i>.437</i>	
<i>TOP</i>			<i>.427</i>	
<i>TOP HD. IN.</i>			<i>.660</i>	
<i>TOP HD. OUT.</i>			<i>.655</i>	

COMMENTS: *MEASUREMENTS ARE IN INCHES AND INCLUDE*
APPARENT PAINT THICKNESS.

TERA, INC.
LEAK TEST RECORD

CLIENT:	American Cyanamid	Sheet:	1 of 1
PLANT LOCATION:	Westwego, Louisiana	Job No.:	89-152-1
		Date:	01/24/90
		By:	THW

COMMENTS:

ITEM TESTED: Replacement WWC Secondary Sand Filter

NORMAL OPERATING PRESSURE: Less than 50 psig

RELIEF PRESSURE:

DESIGN PRESSURE: 100 psig

TEST TYPE: Operating

TEST PRESSURE: 31 psig

TEST DURATION: 30 minutes observed

TEST RESULTS: Satisfactory

CHART NO.: None

WITNESSED BY: THW

DATE: 01/24/90

COMMENTS:



TERA, Inc.

6440 Hillcroft, Suite 200
P.O. Box 740038, Houston, Texas 77274, Tel. 713/772-0876, Fax: 713/981-7713

91-129

HAZARDOUS WASTE SYSTEM REPLACEMENT COMPONENT CERTIFICATION

I have supervised and reviewed the design assessment for the replacement "NSB Backwash Tank" at the American Cyanamid Company Fortier Plant in Westwego, Louisiana. This work, as described in the attached report dated June 29, 1992, was performed in accordance with applicable portions of Resource Conservation and Recovery Act (RCRA) regulations 40 CFR 265.192 and 40 CFR 265.193, and the corresponding requirements of LAC 33:V.1905 and LAC 33:V.1907.

With regard to this duty, I certify under penalty of law that I have personally examined and am familiar with the information submitted in the document and all related attachments and that, based on my observations and my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Thomas H. Wimbrow

Registered Professional Engineer

Louisiana No. 23062

TERA, Inc.

P.O. Box 740038

Houston, Texas 77274

Signed: 

Date: JUNE 26, 1992



TERA, Inc.

6440 Hillcroft, Suite 200
P.O. Box 740038, Houston, Texas 77274, Tel. 713/772-0876, Fax. 713/981-7713

June 29, 1992
91-129

Ms. Cheryl Beynon
AMERICAN CYANAMID COMPANY
10800 River Road
Westwego, Louisiana 70094

Subject: Replacement NSB Backwash Tank Design Certification

Dear Ms. Beynon:

Submitted here is our certified design assessment report for the replacement NSB Backwash Tank at Cyanamid's Fortier plant. The report includes assessment and certification of the replacement tank design and review of the tank bottom leak detection provisions.

The main report body summarizes assessment results in a format corresponding to the rules being addressed. Detailed information and documentation are presented in an Appendix.

We have enjoyed working with you on this interesting project, and look forward to another opportunity to be of service to Cyanamid. Please contact us at 713/772-0876 if you have any questions.

Very truly yours,

TERA, Inc.

Thomas H. Wimbrow, P.E.
Project Manager

THW/lf

Enclosure: Eight (8) Copies TERA Report 91-129

JUNE 26, 1992

HAZARDOUS WASTE SYSTEM
REPLACEMENT COMPONENT
DESIGN ASSESSMENT
NSB BACKWASH TANK

* * *

To

AMERICAN CYANAMID COMPANY
Westwego, Louisiana

* * *

By

TERA, Inc.
Houston, Texas

June 1992

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
COMPONENT DESCRIPTION	1
CONSIDERATIONS OF DESIGN ASSESSMENT	2
1. Design Standards	2
2. Hazardous Characteristics of the Waste	3
3. Corrosion Protection	4
4. Protection from Vehicular Traffic	4
5. Foundation Design	4
6. Ancillary Equipment	5
OTHER DESIGN CONSIDERATIONS	5
1. Pressure Controls	5
2. Spill and Overfill Prevention	6
SECONDARY CONTAINMENT	6
CONCLUSIONS OF ASSESSMENT	10

APPENDIX A - Design and Assessment Documentation

HAZARDOUS WASTE SYSTEM
REPLACEMENT COMPONENT
DESIGN ASSESSMENT

This report documents the design assessment performed for the replacement "NSB Backwash Tank" at the American Cyanamid Fortier Plant in Westwego, Louisiana. The assessment described here was performed to address the requirements of 40 CFR 265.192 and 40 CFR 265.193, and the corresponding requirements of Louisiana Department of Environmental Quality regulations in LAC 33:V.1905 and LAC 33:V.1907.

COMPONENT DESCRIPTION

The replacement NSB Backwash Tank (equipment item no. 100-6) is a 12'-1 1/2" inside diameter by 24'-0" high vertical cylindrical tank with a flat bottom and a cone roof. It is constructed of welded carbon steel and has a capacity of 19,000 gallons (with two feet of freeboard to the top of the shell). Operating pressure for the tank is atmospheric pressure. It is located on-ground and is supported by a reinforced concrete foundation. The new tank is being installed as a replacement for a tank that was previously used for this service. The previous tank was closed by Cyanamid in 1988 under DEQ Closure Permit No. LAD007175390-CP3.

Ancillary equipment being installed along with the replacement Backwash Tank includes carbon steel piping connecting the tank to existing waste system piping; valves to control the flow of liquid to and from the tank; and controls and instrumentation to monitor the tank liquid level. The controls provided will automatically shut off the tank inlet valve when the tank reaches its capacity, and provide and control a nitrogen blanket in the tank vapor space. The tank foundation includes provisions for the retention and detection of leakage through the tank bottom. Secondary containment for the contents of the tank is provided by the

COMPONENT DESCRIPTION (Continued)

existing aboveground concrete "vault" or diked area that surrounds the tank.

The scope of this report is limited to assessment of the design of replacement NSB Backwash Tank (Item 100-6) and the new piping, valves, controls, and leak detection measures associated with the replacement tank.

CONSIDERATIONS OF DESIGN ASSESSMENT

1. Design Standards (40 CFR 265.192(a)(1))

Design documentation provided by American Cyanamid for the replacement tank and associated new ancillary equipment items is included in the Appendix to this report. Documentation of the design review and assessment performed by TERA is also included in the Appendix. The replacement component designs have been reviewed for compliance with the following codes and standards:

- American Petroleum Institute, API 650, *Welded Steel Tanks for Oil Storage*, 8th Edition (tank)
- American National Standards Institute, ANSI B31.3, *Petroleum Refinery Piping* (piping and ancillary equipment)
- American Society of Civil Engineers, ASCE Standard 7-88, *Minimum Design Loads in Buildings and Other Structures* (environmental loads)
- American Concrete Institute, ACI 318-89, *Building Code Requirements for Reinforced Concrete* (foundation)

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)

1. Design Standards (40 CFR 265.192(a)(1)) (Continued)

The design review performed indicates that:

- The design substantially conforms to the standards referenced above; and
- Those design standards are appropriate for this application.

The conclusion after review of the documentation provided is that the design of the replacement NSB Backwash Tank and associated new ancillary equipment items appears to be appropriate for the intended service. The structural strength, support, and seams of the components appear to be adequately designed.

2. Hazardous Characteristics of the Waste (40 CFR 265.192(a)(2) and 40 CFR 265.193)

The wastes which will be handled by NSB Backwash Tank 100-6 are aqueous streams containing trace organics. The replacement tank 100-6 will be classified as a treatment tank and will manage backwash from American Cyanamid's (1) Net Stripper Bottoms and (2) Miscellaneous Effluent Sand Filters (EPA Hazardous waste code no. (1) K013; and (2) mixture of K011, K013, U002, U003, U007, U008, U009, U0154, U0162, U0220, P069, D001, D002 and D003, respectively). Additional waste data provided by American Cyanamid is included in the Appendix to this report.

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)3. Corrosion Protection (40 CFR 265.192 (a)(3))

The exterior of the replacement storage tank and new piping will be protected from atmospheric corrosion by a paint coating. Review of the waste composition and past experience at this plant has shown the waste to be compatible with and not excessively corrosive to the tank and ancillary equipment item materials of construction. No external metal components of the new tank or ancillary equipment items are to be in contact with soil or water. Therefore, the new components do not require cathodic protection.

In summary, a review of the corrosion protection measures and materials of construction used indicates that they should provide satisfactory protection under the intended service conditions.

4. Protection From Vehicular Traffic (40 CFR 265.192(a)(4))

No underground components are used in this system. The tank and new components will be protected from vehicular traffic by their location in an area away from traffic and by the reinforced concrete containment vault walls.

5. Foundation Design (40 CFR 265.192(a)(5))

Calculations in the Appendix indicate that the tank foundation should be capable of supporting the full weight of the tank and its contents. The tank and containment vault are located aboveground so they are not in a saturated zone. The tank is located in an ASCE 7-88 Seismic Zone 0 area. Therefore, no special measures are required for seismic force resistance. Calculations in the Appendix

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)5. Foundation Design (40 CFR 265.192(a)(5)) (Continued)

indicate that the tank does not require anchorage for restraint under design code specified wind conditions. The tank anchors that are included in the design will provide an additional margin of protection against tank motion.

6. Ancillary Equipment (40 CFR 265.192(e))

The new ancillary equipment items will be protected from physical damage by being located aboveground in areas away from vehicular traffic. All ancillary equipment items appear to be provided with support that should prevent excessive stress due to settlement, vibration, expansion, or contraction. The ancillary equipment components appear to comply with ANSI B31.3 requirements.

OTHER DESIGN CONSIDERATIONS1. Pressure Controls

Design documentation included in the Appendix indicates that the replacement tank will be provided with a pressure/vacuum vent sized for normal operation of the tank, an emergency pressure relief vent sized to prevent overpressuring of the tank under emergency conditions, and a nitrogen blanket system designed to maintain an inert nitrogen atmosphere in the tank vapor space. Under normal (i.e., non-emergency) conditions, vapors released from the tank will be contained by piping and transferred to a flare for disposal. The tank pressure controls provided appear to provide tank over- and under-pressure protection in compliance with appropriate design code requirements.

OTHER DESIGN CONSIDERATIONS (Continued)

2. Spill and Overfill Prevention

The replacement tank and new piping components form a closed, permanently connected system. Since there are no connections that are routinely connected and disconnected, the likelihood of spills is minimized.

Overfilling of the tank will be prevented by a level indicator that will display the tank liquid level for the plant operators and by a level switch that will automatically close a valve and stop the flow of waste into the tank when the tank level reaches its capacity. The tank is also provided with manual valves to stop the flow of waste into the tank. Details of the tank level control system are included in the Appendix. Additional overfill protection is provided by the two feet of freeboard between the tank maximum working capacity level and the top of the tank shell. If the tank were to be overfilled, the tank emergency vent would open and release excess liquid. This would prevent overpressure damage to the tank. Released liquid would be retained by the tank area containment vault.

SECONDARY CONTAINMENT ASSESSMENT

1. Materials Compatibility (40 CFR 265.193(c)(1))

The waste material stored in the replacement tank will be wastewater, which consists primarily of water plus various site specific organic contaminants as described in documentation included in the Appendix. Based on experience, this material is compatible with and not corrosive to the tank bottom leak detection and secondary containment system materials of construction which consist

SECONDARY CONTAINMENT ASSESSMENT (Continued)1. Materials Compatibility (40 CFR 265.193(c)(1)) (Continued)

primarily of reinforced concrete, stone, and various forms of polyethylene.

2. Strength (40 CFR 265.193(c)(1))

The strength of the tank foundation and leak detection measures were reviewed and appear to comply with applicable construction standards. Documentation of the review performed is included in the Appendix of this report. The existing tank area containment vault will provide secondary containment for the tank and new ancillary equipment. The vault has been in service for several years and has provided satisfactory service with no evidence of failure.

3. Foundation (40 CFR 265.193(c)(2))

The foundation for the replacement tank and new ancillary equipment item secondary containment system consists of the tank support pad and the existing concrete slab floor of the tank area containment vault. Review of the tank support pad indicates that it should be capable of supporting the tank and its contents and resist pressure gradients and failure due to settlement, compression, or uplift. The containment vault floor slab has been in service for several years and has provided satisfactory service with no evidence of failure.

SECONDARY CONTAINMENT ASSESSMENT (Continued)4. Leak Detection (40 CFR 265.193(c)(3))

The replacement tank support pad or foundation is provided with a liner that is compatible with and impermeable to the waste to be stored. The foundation is also provided with means (drain pipes and a collection sump) for collecting and retaining for detection any liquid that might leak through the tank bottom. Details of the tank foundation leak detection system are included in documentation in the Appendix to this report.

All new ancillary equipment components installed with the tank will be aboveground and accessible for visual inspection. Leakage from ancillary equipment items or portions of the tank other than the bottom will be retained by the containment vault for visual detection.

5. Liquid Removal (40 CFR 265.193(c)(4))

Minor leaks through the tank bottom will be collected by the leak detection provisions included in the tank support pad design and retained in the "leak detection sump" provided. Liquids can be removed from the leak detection sump by manual methods. Larger tank leaks or leaks from ancillary equipment items will be retained by the existing tank area containment vault. The vault floor is constructed to drain to a sump. The sump is provided with an automatic pump that transfers liquids from the sump to the NSB Backwash Tank or to the plant "Miscellaneous Effluent Treatment" system. The MET system holds wastes prior to disposal.

SECONDARY CONTAINMENT ASSESSMENT (Continued)6. Device Requirements for Vault (40 CFR 265.193(d) and (e)(2))

The capacity of the existing tank area secondary containment vault was reviewed and documented in TERA, Inc. Report 91-105 (March 5, 1991). That review indicated that the containment vault where the replacement NSB Backwash Tank will be located has sufficient volume to retain the entire contents of a 50,000-gallon tank plus water from a 12.3-inch rainfall. Weather Bureau Technical Paper No. 40 gives the 25-year, 24-hour rainfall for the plant area as less than 11 inches. The vault therefore has more than sufficient volume to contain the 19,000-gallon capacity of the NSB Backwash Tank plus rainfall from a 25-year, 24-hour storm.

Published data and experience at this plant indicates that the reinforced concrete materials of construction of the tank area containment vault are compatible with the wastes to be stored.

7. Ancillary Equipment (40 CFR 265.193(f)(1))

All of the new ancillary equipment items installed in conjunction with the replacement NSB Backwash Tank will be located aboveground and will be accessible for visual inspection and detection of leakage. All new valves, threaded connections, and other non-exempt equipment items, joints and connections are located above the existing tank area containment vault. The vault is constructed of materials compatible with and effectively impervious to the waste. The vault will retain spilled or leaked liquids for detection prior to their transfer back to the Backwash Tank or to the MET system for storage and disposal.

CONCLUSIONS OF ASSESSMENT

Based on the information presented above and included in the Appendix to this report, the replacement NSB Backwash Tank (Item 100-6) and its associated new ancillary equipment items, appear to be designed to have sufficient structural strength and support and be sufficiently compatible with the wastes to be stored to not leak, collapse, rupture, or fail if operated in its intended manner and service. Secondary containment measures have been provided whose design appears to meet the requirements of 40 CFR 265.193 and LAC 33:V.1907.

APPENDIX A

Design and Assessment Documentation

APPENDIX A

Design and Assessment Documentation

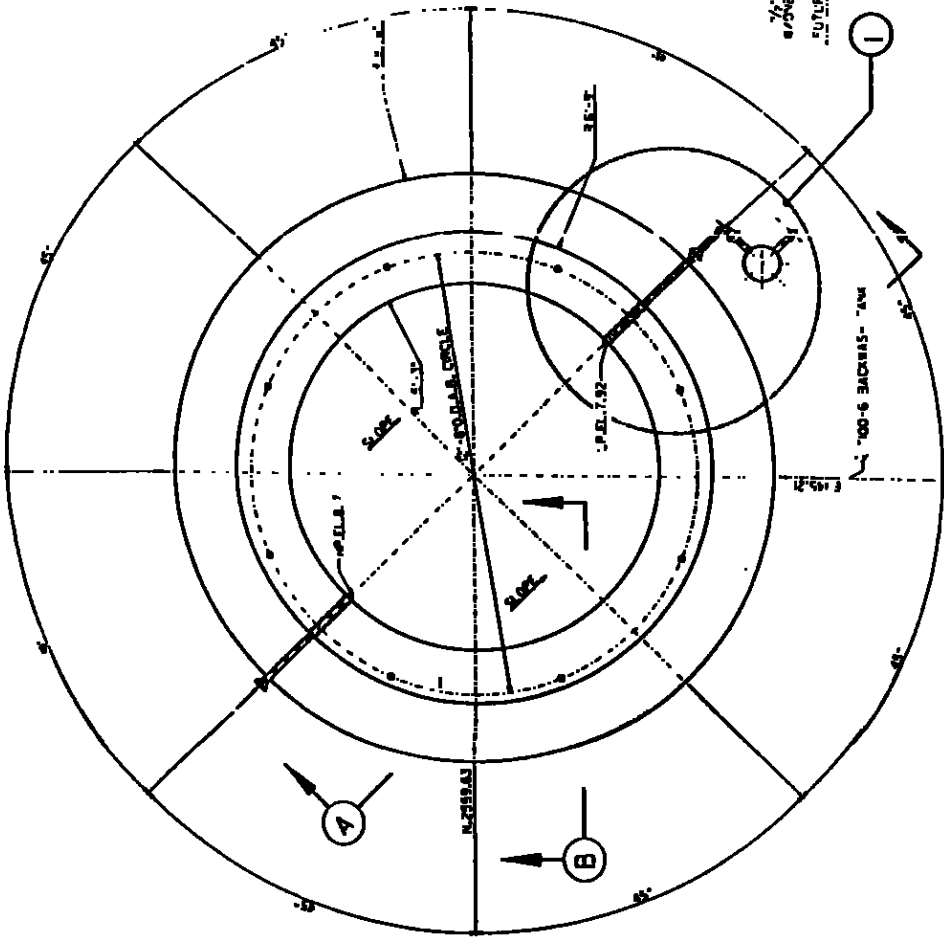
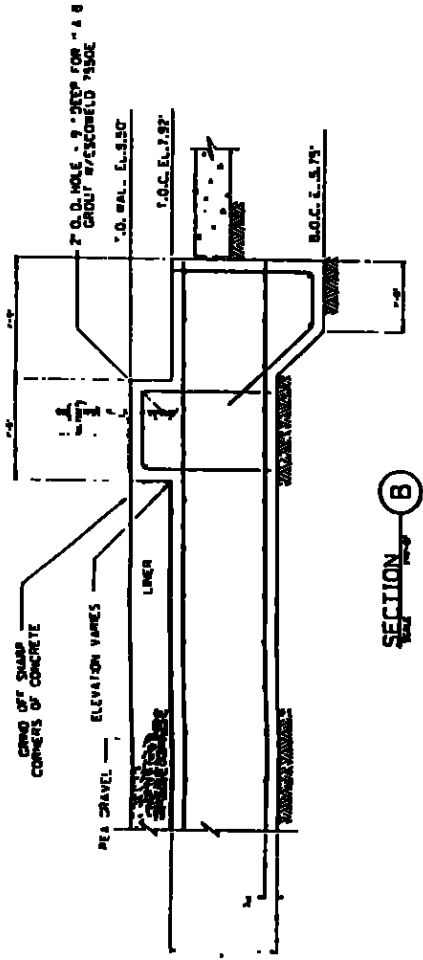
TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
Cyanamid Drawing No. 10-5-87, NSB Backwash Tank	A- 1
Cyanamid Drawing No. 10-1-61, Foundation for NSB Backwash Tank	A- 2
Cyanamid Drawing No. 10-0-121, Waste Disposal P&ID	A- 3
Cyanamid Drawing No. 10-0-122, WWCB Tanks P&ID	A- 4
Cyanamid Drawing No. 10-0-124, Flare Header System P&ID	A- 5
Cyanamid Drawing No. 36-0-19, Effluent Flow Diagram	A- 6
TERA Vertical Tank Gravity and Wind Loads (3-9-92)	A- 7
TERA Atmospheric Tank Venting Requirements (3-10-92)	A-11
TERA Foundation Review	A-13
Waste Analysis Data (4-9-92)	A-27

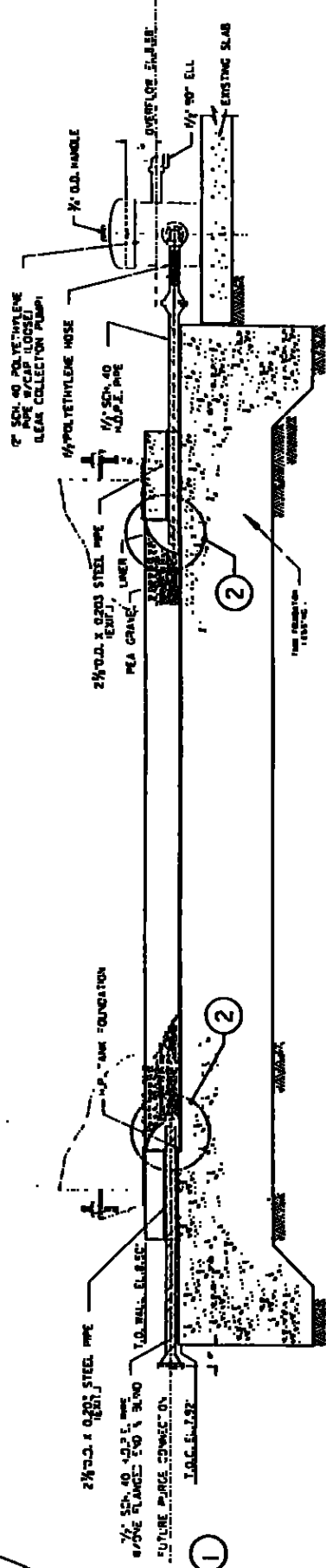
LEGEND
P.P. - POLYPROPYLENE
C.C. - CLEAN CUT
L.C.S. - LEAK COLLECTION SUMP
F.P.C. - FUTURE PULSE CONNECTION

NOTES:

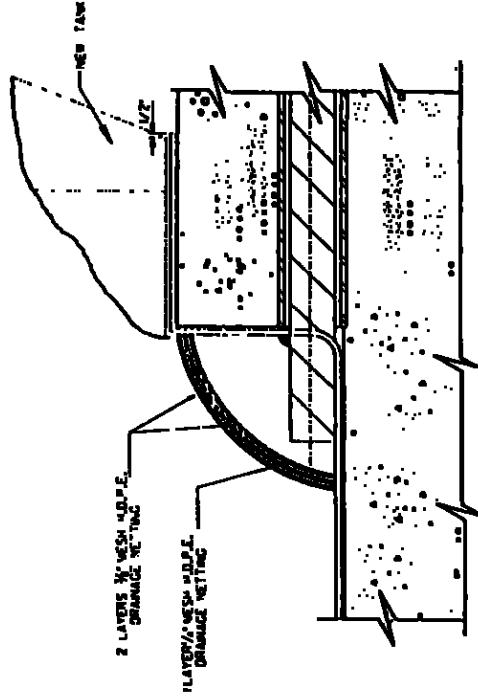
1. SEE DRG 59 FOR DETAILS OF L.C.S. AND LINER
2. PEA GRAVEL SHALL BE SMOOTH, UNIFORM, GRADED GRAVEL WITH 100% PASSING THE NO. 40 SIEVE AND 100% RETAINED ON THE NO. 4 SIEVE.
3. ELASTOMERIC JOINT MATERIAL, 3/4" BE MAX. TV 92 FLEXPAC JOINT COMPOUND AS MANUFACTURED BY LP INDUSTRIES OR APPROVED EQUAL.
4. CORE DRILL FOR ANCHOR BOLTS
5. ANCHOR BOLT TO BE 304 S.S. ALL TUBES 1/2" DIA. AND 8' LONG
6. ANCHOR BOLT TO BE 304 S.S. ALL TUBES 1/2" DIA. AND 8' LONG



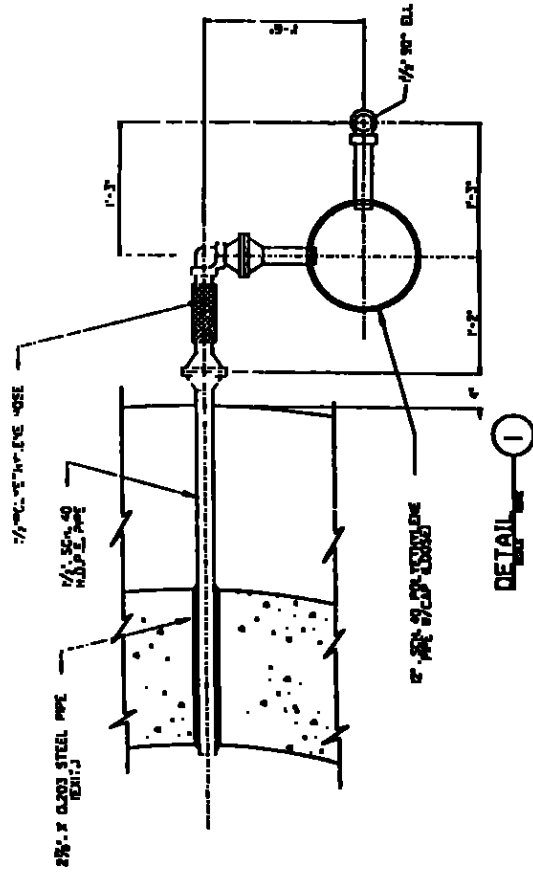
NSB TANK FOUNDATION PLAN



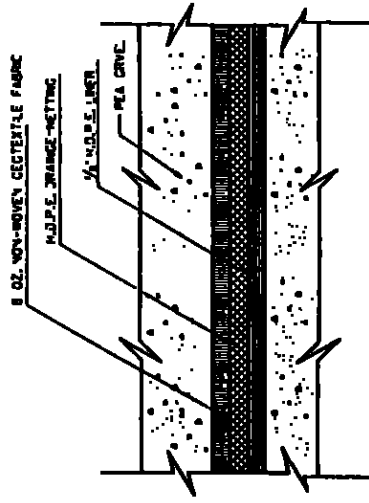
SECTION A



DETAIL 2



DETAIL 1



LINER DETAIL

CYANAMID		AUTHORIZATION NO.	
CHEMICAL PRODUCTS DIVISION		PROJECT NAME	
ACTIVITY PLAN		FOUNDATION FOR NSB BACKWASH TANK	
DATE	10/1/61	BY	10/1/61
DESIGNED BY		CHECKED BY	
DRAWN BY		APPROVED BY	
SCALE		REVISIONS	

REVISION	DATE	DESCRIPTION	BY	CHK	APP	REVISION	DATE	DESCRIPTION	BY	CHK	APP
1	10/1/61	FOUNDATION FOR NSB BACKWASH TANK				1	10/1/61	FOUNDATION FOR NSB BACKWASH TANK			
2						2					
3						3					
4						4					
5						5					
6						6					
7						7					
8						8					
9						9					
10						10					



WVCBN-SC
VENT SCRUBBER WITH
FLAME ARRESTION

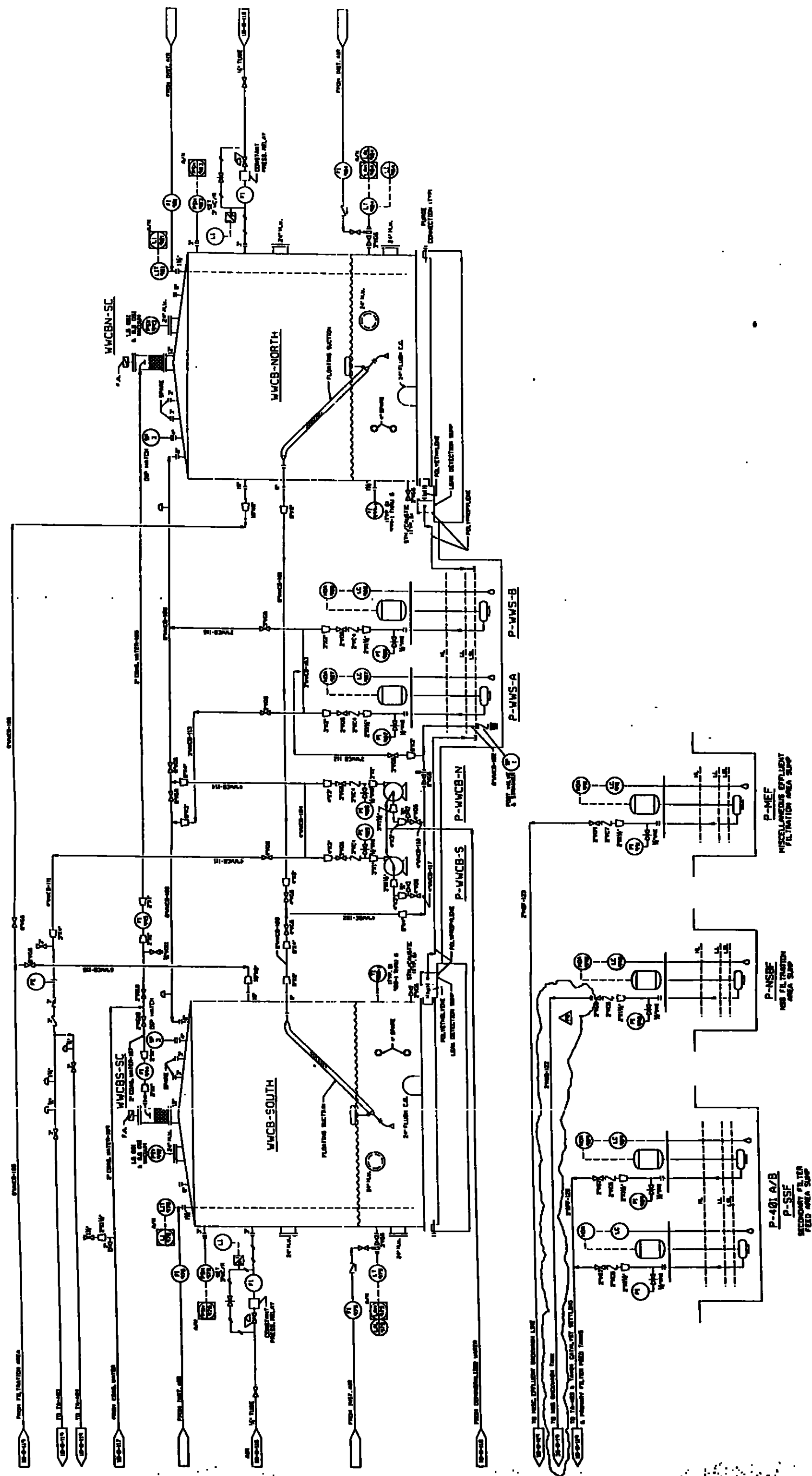
WVCB-NORTH
38" DIA. X 38' HIGH

P-WVS-A & B
SLIP PUMPS

P-WVCB-N & S
TRANSFER PUMPS

WVCB-SOUTH
38" DIA. X 38' HIGH

WVCBS-SC
VENT SCRUBBER WITH
FLAME ARRESTION



ITEM		DESCRIPTION	DATE	BY	APPROVAL	AUTHORIZATION NO.
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9
10	10	10	10	10	10	10
11	11	11	11	11	11	11
12	12	12	12	12	12	12
13	13	13	13	13	13	13
14	14	14	14	14	14	14
15	15	15	15	15	15	15
16	16	16	16	16	16	16
17	17	17	17	17	17	17
18	18	18	18	18	18	18
19	19	19	19	19	19	19
20	20	20	20	20	20	20
21	21	21	21	21	21	21
22	22	22	22	22	22	22
23	23	23	23	23	23	23
24	24	24	24	24	24	24
25	25	25	25	25	25	25
26	26	26	26	26	26	26
27	27	27	27	27	27	27
28	28	28	28	28	28	28
29	29	29	29	29	29	29
30	30	30	30	30	30	30
31	31	31	31	31	31	31
32	32	32	32	32	32	32
33	33	33	33	33	33	33
34	34	34	34	34	34	34
35	35	35	35	35	35	35
36	36	36	36	36	36	36
37	37	37	37	37	37	37
38	38	38	38	38	38	38
39	39	39	39	39	39	39
40	40	40	40	40	40	40
41	41	41	41	41	41	41
42	42	42	42	42	42	42
43	43	43	43	43	43	43
44	44	44	44	44	44	44
45	45	45	45	45	45	45
46	46	46	46	46	46	46
47	47	47	47	47	47	47
48	48	48	48	48	48	48
49	49	49	49	49	49	49
50	50	50	50	50	50	50
51	51	51	51	51	51	51
52	52	52	52	52	52	52
53	53	53	53	53	53	53
54	54	54	54	54	54	54
55	55	55	55	55	55	55
56	56	56	56	56	56	56
57	57	57	57	57	57	57
58	58	58	58	58	58	58
59	59	59	59	59	59	59
60	60	60	60	60	60	60
61	61	61	61	61	61	61
62	62	62	62	62	62	62
63	63	63	63	63	63	63
64	64	64	64	64	64	64
65	65	65	65	65	65	65
66	66	66	66	66	66	66
67	67	67	67	67	67	67
68	68	68	68	68	68	68
69	69	69	69	69	69	69
70	70	70	70	70	70	70
71	71	71	71	71	71	71
72	72	72	72	72	72	72
73	73	73	73	73	73	73
74	74	74	74	74	74	74
75	75	75	75	75	75	75
76	76	76	76	76	76	76
77	77	77	77	77	77	77
78	78	78	78	78	78	78
79	79	79	79	79	79	79
80	80	80	80	80	80	80
81	81	81	81	81	81	81
82	82	82	82	82	82	82
83	83	83	83	83	83	83
84	84	84	84	84	84	84
85	85	85	85	85	85	85
86	86	86	86	86	86	86
87	87	87	87	87	87	87
88	88	88	88	88	88	88
89	89	89	89	89	89	89
90	90	90	90	90	90	90
91	91	91	91	91	91	91
92	92	92	92	92	92	92
93	93	93	93	93	93	93
94	94	94	94	94	94	94
95	95	95	95	95	95	95
96	96	96	96	96	96	96
97	97	97	97	97	97	97
98	98	98	98	98	98	98
99	99	99	99	99	99	99
100	100	100	100	100	100	100

WASTE DISPOSAL
WVCB TANKS NORTH & SOUTH
P&ID

10 0 122 PB

Client: American Cyanamid
Location: Westwego, LA
Item: Replacement Backwash Tank
Item No. 100-6

Job. No.: 91-129
Date: March 9, 1992
By: THW
Page 1 of 4

VERTICAL TANK GRAVITY AND WIND LOADS

Wind load analysis per:

American Society of Civil Engineers, ASCE Standard 7-88,
Minimum Design Loads in Buildings and Other Structures

Reference: Cyanamid Drawing No. 10-5-87

Tank Data:

Diameter = $D = 12.125 \text{ ft}$

Height to top of Shell = $H = 24 \text{ ft}$

Ht. to top of shell thickness $t_1 = H_1 = 24 \text{ ft}$

Ht. to top of shell thickness $t_2 = H_2 = 24 \text{ ft}$

Ht. to top of shell thickness $t_3 = H_3 = 24 \text{ ft}$

Shell thickness $t_1 = 0.3125 \text{ in}$

Shell thickness $t_2 = 0 \text{ in}$

Shell thickness $t_3 = 0 \text{ in}$

Roof slope = $S = \frac{2}{12}$

Roof thickness = $t_r = 0.3125 \text{ in}$

Floor thickness = $t_f = 0.3125 \text{ in}$

Estimated appurtanance weight = $W_a = 5\%$ (percent of total weight)

Density of steel = $w = 490 \frac{\text{lb}}{\text{ft}^3}$

Tank bottom coefficent of friction = $m = 0.5$ (ref. Marks)

Estimated Tank Weight:

$$\text{Shell: Section 1} = W_{s1} = p \cdot D \cdot H_1 \cdot \frac{t_1}{12 \cdot \frac{\text{in}}{\text{ft}}} \cdot w$$

$$W_{s1} = 11666 \cdot \text{lb}$$

$$\text{Section 2} = W_{s2} = p \cdot D \cdot [H_2 - H_1] \cdot \frac{t_2}{12 \cdot \frac{\text{in}}{\text{ft}}} \cdot w$$

$$W_{s2} = 0 \cdot \text{lb}$$

Client: American Cyanamid
 Location: Westwego, LA
 Item: Replacement Backwash Tank
 Item No. 100-6

Job. No.: 91-129
 Date: March 9, 1992
 By: THW
 Page 2 of 4

Estimated Tank Weight: (continued)

$$\text{Section 3} = W_{s3} := p \cdot D \cdot [H_3 - H_2] \cdot \frac{t_3}{12 \cdot \frac{\text{in}}{\text{ft}}} \cdot w$$

$$W_{s3} = 0 \cdot \text{lb} \cdot \text{ft}$$

$$\text{Total shell} = W_s := W_{s1} + W_{s2} + W_{s3}$$

$$W_s = 11666 \cdot \text{lb} \cdot \text{ft}$$

$$\text{Roof: } W_r := p \cdot \frac{D}{2} \cdot \sqrt{\left[\frac{D}{2}\right]^2 + (D \cdot S)^2} \cdot \left[\frac{t_r}{12 \cdot \frac{\text{in}}{\text{ft}}}\right] \cdot w$$

$$W_r = 1553 \cdot \text{lb} \cdot \text{ft}$$

$$\text{Floor: } W_f := \frac{p}{4} \cdot D^2 \cdot \left[\frac{t_f}{12 \cdot \frac{\text{in}}{\text{ft}}}\right] \cdot w$$

$$W_f = 1473 \cdot \text{lb} \cdot \text{ft}$$

Total Weight of Tank:

$$W_t := [W_s + W_r + W_f] \cdot [1 + W_a]$$

$$W_t = 15427 \cdot \text{lb} \cdot \text{ft}$$

WIND LOAD ON TANK

Wind Load Data:

Basic Wind Speed = $V := 100 \cdot \text{mph}$ (Fig. 1)

Importance Factor = $I := 1.05$ (Table 5)

Exposure Category = C (6.5.3.1)

Velocity Pressure Exposure Coefficient = $K_z := 0.93$
 (Table 6)

Gust Response Factor = $G_h = 1.27$ (Table 8)

Client: American Cyanamid
 Location: Westwego, LA
 Item: Replacement Backwash Tank
 Item No. 100-6

Job. No.: 91-129
 Date: March 9, 1992
 By: THW
 Page 3 of 4

Wind Load Data: (continued)

$$\text{Force Coefficient (basic)} = C_{fb} = 0.5 \text{ (Table 12)}$$

$$\text{Force Coefficient (adjusted)} = C_f = C_{fb} + \left[\frac{\frac{H}{D} - 1}{6} \right] \cdot 0.1$$

$$C_f = 0.52$$

Wind Load Calculations:

$$\begin{aligned} \text{Velocity Pressure} = q_z &= 0.00256 \cdot K_z \cdot \left[1 + \left[\frac{v}{\text{mph}} \right]^2 \right] \cdot \frac{\text{lb}_f}{\text{ft}^2} \\ q_z &= 25 \cdot \frac{\text{lb}_f}{\text{ft}^2} \end{aligned}$$

$$\text{Normal Area} = A_f = D \cdot H$$

$$\begin{aligned} \text{Design Wind Force} = F &= q_z \cdot G_h \cdot C_f \cdot A_f \\ F &= 4770 \cdot \text{lb}_f \end{aligned}$$

SLIDING RESISTANCE

$$\begin{aligned} \text{Coefficient of Friction required} = f &= \frac{F}{W_t} \\ f &= 0.31 \end{aligned}$$

$$\text{Coefficient of Friction available} = m = 0.5$$

Coefficient required < available

- therefore no restraint provisions are required to resist the design wind sliding force.

Client: American Cyanamid
Location: Westwego, IA
Item: Replacement Backwash Tank
Item No. 100-6

Job. No.: 91-129
Date: March 9, 1992
By: THW
Page 4 of 4

TANK OVERTURNING

$$\text{Tank overturning moment} = M_w = F \cdot \frac{H}{2}$$

$$M_w = 57242 \cdot \text{lb} \cdot \text{ft}$$

$$\text{Overturning resistance} = M_r = W_t \cdot \frac{D}{2}$$

(empty tank)

$$M_r = 93524 \cdot \text{lb} \cdot \text{ft}$$

$$\frac{2}{3} \cdot M_r = 62350 \cdot \text{lb} \cdot \text{ft}$$

$$\frac{2}{3} \cdot M_r = 62350 \cdot \text{lb} \cdot \text{ft} > M_w = 57242 \cdot \text{lb} \cdot \text{ft}$$

- therefore no restraint provisions are required
to resist the design wind overturning moment.

Job. No.: 91-129
Date: March 10, 1992
By: THW
Page 1 of 2

Determination of normal and emergency (fire exposure) venting requirements for non-refrigerated storage tanks with design pressures of 1 psig or less. Procedures used are in accordance with API Standard 2000 - 1982 "Venting Atmospheric and Low-Pressure Storage Tanks". Emergency venting capacity is calculated using the characteristics of hexane.

TERA, INC.

Client: American Cyanamid
Location: Westwego, LA
Item: Replacement Backwash Tank
Item No. 100-6

Job. No.: 91-129
Date: March 10, 1992
By: THW
Page 2 of 2

VENTING CAPACITY REQUIREMENTS

Note: SCFH = Standard Cubic Feet of Air per Hour

Normal Inbreathing. (vacuum relief)

Thermal Flow = $TV_i = 494 \cdot \text{SCFH}$

Displacement Flow = $DV_i = 2000 \cdot \text{SCFH}$

Total Normal Inbreathing = $NV_i = TV_i + DV_i$

$NV_i = 2494 \cdot \text{SCFH}$

Normal Outbreathing. (pressure relief)

Thermal Flow = $TV_o = 296 \cdot \text{SCFH}$

Displacement Flow = $DV_o = 2143 \cdot \text{SCFH}$

Total Normal Outbreathing = $NV_o = TV_o + DV_o$

$NV_o = 2439 \cdot \text{SCFH}$

Emergency Venting (pressure relief)

Note: Emergency venting provisions are not required if tank is constructed with a weak roof-to-shell attachment in accordance with API 650 specifications.

Emergency Vent Capacity = EV (ref. API 2000, Table 2)

$EV = 529965 \cdot \text{SCFH}$

MATS SLAB ANALYSIS

Attached are pages from a computer printout from the MATS slab analysis program which indicate that the foundation slab is adequate for the expected load conditions. Included are graphs of the maximum moments and deflections experienced by the slab.

***** INPUT ECHO *****

0File name: CYAN1.MAT
Project: Units: US in-lb
Engineer: Code: ACI318-83

0 General Information

f'c, Compressive Strength = 3.0 KSI
Ec, Elastic Modulus = 3155.9 KSI
w, Weight = 145.0 PCF
v, Poisson's Ratio = .150
Fy, Reinforcement Strength = 60.0 KSI
Qa, Allowable Soil Contact Pressure = .0 TSF
0Approximate Slab Dimensions:
Length = 20.0 FT Width = 10.0 FT Thickness = 1.5 FT
OR/F Cover to Tension Face (IN)
TOP X = 2.00 TOP Y = 2.00 BOT X = 2.00 BOT Y = 2.00

Strength Design Load Factors

	Dead	Live	Lateral
Loading #1 =	1.400 +	1.700 +	.000
Loading #2 =	1.050 +	1.275 +	1.275
Loading #3 =	1.050 +	.000 +	1.275
Loading #4 =	.900 +	.000 +	1.300

Properties of Slab Mesh

189 Nodes 158 Elements 11 Regions 21 Restrained Nodes

0 Properties of Regions

Regn. No.	Start Elem.	N o d e I	J	Positions K	L	No. of Elems. X-axis	Y-axis	Element size X-axis	Y-axis	Elem. Thick	Subgrade Modulus PCI
1	1	1	5	0	0	3	1	1.00	1.00	1.50	200.0
2	4	5	11	0	0	5	1	1.00	1.00	1.50	200.0
3	9	11	19	0	0	7	1	1.00	1.00	1.50	200.0
4	16	19	28	24	37	8	2	1.00	1.00	1.50	200.0
5	32	37	47	41	57	9	2	1.00	1.00	1.50	200.0
6	50	57	68	112	123	10	6	1.00	1.00	1.50	200.0
7	110	123	134	119	144	9	2	1.00	1.00	1.50	200.0
8	128	144	154	136	163	8	2	1.00	1.00	1.50	200.0
9	144	163	172	0	0	7	1	1.00	1.00	1.50	200.0
10	151	172	180	0	0	5	1	1.00	1.00	1.50	200.0
11	156	180	186	0	0	3	1	1.00	1.00	1.50	200.0

```

*****
* APPROX SLAB SIZE ( 20.0 , 10.0 , 1.5 ) FT *
*
* MATERIAL PROPERTIES
* COMPRESSIVE STRENGTH 3. KSI
* ELASTIC MODULUS 3156. KSI
* WEIGHT 145. PCF
* POISSON'S RATIO .150
* REINFORCEMENT YIELD STRENGTH 60. KSI
* ALLOWABLE SOIL CONTACT PRESSURE .0 TSF
* CONCRETE COVER ( IN )
* TOP BARS BOTTOM BARS
* X Y X Y
* 2.00 2.00 2.00 2.00
*
* ANALYSIS IS MADE USING THE THEORY OF THIN
* PLATE BENDING AND THE FINITE ELEMENT METHOD
*-----*
* ACI CODE LOADING CASES
*-----*
* STANDARD LOADING CASES IN ACCORDANCE WITH
* THE ACI-83 BUILDING CODE ARE (OPTIONAL)
*
* Case No Service Load Strength Design Load
*-----*
* 1 D + L 1.4D + 1.7L
* 2 D + L + W 0.75(1.4D+1.7L+1.7W)
* 3 D + W 0.75(1.4D + 1.7W)
* 4 NONE 0.9D + 1.3W
*
* D-DEAD LOAD L-LIVE LOAD W-LATERAL LOAD
*-----*
* IMPORTANT NOTES
*-----*
* 1.Deflections and pressure are computed
* under service load conditions.
* 2.Pressure is the maximum value of all
* service load cases.
* 3.Moments and reinforcement are the maximum
* values of all strength design load cases.
* 4.Reinforcement is computed by strength
* design method.
*
*****

```

MAXIMUM MOMENTS AROUND COLUMNS AT ULTIMATE

UNITS ARE LB.FT/FT

X-DIRECTION

* NEGATIVE X-FACE *					* POSITIVE X-FACE *				

COLUMN	MAXIMUM	*LOAD*	MAXIMUM	*LOAD*	MAXIMUM	*LOAD*	MAXIMUM	*LOAD*	

NUMBER	NEG MOMENT	*CASE*	POS MOMENT	*CASE*	NEG MOMENT	*CASE*	POS MOMENT	*CASE*	

* 28 *	0.	* 0 *	0.	* 0 *	0.	* 0 *	9709.	* 1 *	
* 29 *	0.	* 0 *	9651.	* 1 *	0.	* 0 *	9527.	* 1 *	
* 30 *	0.	* 0 *	9344.	* 1 *	0.	* 0 *	9046.	* 1 *	
* 31 *	0.	* 0 *	8678.	* 1 *	0.	* 0 *	8063.	* 1 *	
* 37 *	0.	* 0 *	0.	* 0 *	0.	* 0 *	10938.	* 1 *	
* 38 *	0.	* 0 *	10870.	* 1 *	0.	* 0 *	10724.	* 1 *	
* 39 *	0.	* 0 *	10499.	* 1 *	0.	* 0 *	10166.	* 1 *	
* 40 *	0.	* 0 *	9707.	* 1 *	0.	* 0 *	9093.	* 1 *	
* 41 *	0.	* 0 *	8346.	* 1 *	0.	* 0 *	7397.	* 1 *	
* 47 *	0.	* 0 *	0.	* 0 *	0.	* 0 *	11883.	* 1 *	
* 48 *	0.	* 0 *	11804.	* 1 *	0.	* 0 *	11641.	* 1 *	
* 49 *	0.	* 0 *	11387.	* 1 *	0.	* 0 *	11027.	* 1 *	
* 50 *	0.	* 0 *	10551.	* 1 *	0.	* 0 *	9945.	* 1 *	
* 51 *	0.	* 0 *	9195.	* 1 *	0.	* 0 *	8291.	* 1 *	
* 52 *	0.	* 0 *	7269.	* 1 *	0.	* 0 *	6104.	* 1 *	
* 57 *	0.	* 0 *	0.	* 0 *	0.	* 0 *	12572.	* 1 *	
* 58 *	0.	* 0 *	12488.	* 1 *	0.	* 0 *	12316.	* 1 *	
* 59 *	0.	* 0 *	12051.	* 1 *	0.	* 0 *	11684.	* 1 *	
* 60 *	0.	* 0 *	11208.	* 1 *	0.	* 0 *	10610.	* 1 *	
* 61 *	0.	* 0 *	9888.	* 1 *	0.	* 0 *	9033.	* 1 *	
* 62 *	0.	* 0 *	8043.	* 1 *	0.	* 0 *	6917.	* 1 *	
* 63 *	0.	* 0 *	5693.	* 1 *	0.	* 0 *	4385.	* 1 *	
* 68 *	0.	* 0 *	0.	* 0 *	0.	* 0 *	13043.	* 1 *	
* 69 *	0.	* 0 *	12957.	* 1 *	0.	* 0 *	12782.	* 1 *	
* 70 *	0.	* 0 *	12517.	* 1 *	0.	* 0 *	12152.	* 1 *	
* 71 *	0.	* 0 *	11684.	* 1 *	0.	* 0 *	11103.	* 1 *	
* 72 *	0.	* 0 *	10405.	* 1 *	0.	* 0 *	9576.	* 1 *	
* 73 *	0.	* 0 *	8622.	* 1 *	0.	* 0 *	7520.	* 1 *	
* 74 *	0.	* 0 *	6283.	* 1 *	0.	* 0 *	4855.	* 1 *	
* 79 *	0.	* 0 *	0.	* 0 *	0.	* 0 *	13317.	* 1 *	
* 80 *	0.	* 0 *	13231.	* 1 *	0.	* 0 *	13057.	* 1 *	
* 81 *	0.	* 0 *	12796.	* 1 *	0.	* 0 *	12434.	* 1 *	

CONTINUED FROM PAGE 34

* 82 *	0. *	0 *	11978. *	1 *	0. *	0 *	11406. *	1 *
* 83 *	0. *	0 *	10726. *	1 *	0. *	0 *	9912. *	1 *
* 84 *	0. *	0 *	8971. *	1 *	0. *	0 *	7867. *	1 *
* 85 *	0. *	0 *	6600. *	1 *	0. *	0 *	5113. *	1 *
* 90 *	0. *	0 *	0. *	0 *	0. *	0 *	13407. *	1 *
* 91 *	0. *	0 *	13322. *	1 *	0. *	0 *	13149. *	1 *
* 92 *	0. *	0 *	12888. *	1 *	0. *	0 *	12530. *	1 *
* 93 *	0. *	0 *	12076. *	1 *	0. *	0 *	11509. *	1 *
* 94 *	0. *	0 *	10835. *	1 *	0. *	0 *	10026. *	1 *
* 95 *	0. *	0 *	9087. *	1 *	0. *	0 *	7979. *	1 *
* 96 *	0. *	0 *	6698. *	1 *	0. *	0 *	5189. *	1 *
* 101 *	0. *	0 *	0. *	0 *	0. *	0 *	13316. *	1 *
* 102 *	0. *	0 *	13231. *	1 *	0. *	0 *	13057. *	1 *
* 103 *	0. *	0 *	12795. *	1 *	0. *	0 *	12434. *	1 *
* 104 *	0. *	0 *	11977. *	1 *	0. *	0 *	11407. *	1 *
* 105 *	0. *	0 *	10726. *	1 *	0. *	0 *	9913. *	1 *
* 106 *	0. *	0 *	8972. *	1 *	0. *	0 *	7867. *	1 *
* 107 *	0. *	0 *	6599. *	1 *	0. *	0 *	5113. *	1 *
* 112 *	0. *	0 *	0. *	0 *	0. *	0 *	13041. *	1 *
* 113 *	0. *	0 *	12956. *	1 *	0. *	0 *	12782. *	1 *
* 114 *	0. *	0 *	12516. *	1 *	0. *	0 *	12150. *	1 *
* 115 *	0. *	0 *	11685. *	1 *	0. *	0 *	11102. *	1 *
* 116 *	0. *	0 *	10405. *	1 *	0. *	0 *	9576. *	1 *
* 117 *	0. *	0 *	8622. *	1 *	0. *	0 *	7520. *	1 *
* 118 *	0. *	0 *	6282. *	1 *	0. *	0 *	4855. *	1 *
* 123 *	0. *	0 *	0. *	0 *	0. *	0 *	12571. *	1 *
* 124 *	0. *	0 *	12488. *	1 *	0. *	0 *	12315. *	1 *
* 125 *	0. *	0 *	12050. *	1 *	0. *	0 *	11683. *	1 *
* 126 *	0. *	0 *	11207. *	1 *	0. *	0 *	10610. *	1 *
* 127 *	0. *	0 *	9889. *	1 *	0. *	0 *	9034. *	1 *
* 128 *	0. *	0 *	8043. *	1 *	0. *	0 *	6918. *	1 *
* 129 *	0. *	0 *	5693. *	1 *	0. *	0 *	4386. *	1 *
* 134 *	0. *	0 *	0. *	0 *	0. *	0 *	11882. *	1 *
* 135 *	0. *	0 *	11803. *	1 *	0. *	0 *	11640. *	1 *
* 136 *	0. *	0 *	11386. *	1 *	0. *	0 *	11026. *	1 *
* 137 *	0. *	0 *	10552. *	1 *	0. *	0 *	9945. *	1 *
* 138 *	0. *	0 *	9194. *	1 *	0. *	0 *	8291. *	1 *
* 139 *	0. *	0 *	7270. *	1 *	0. *	0 *	6105. *	1 *
* 144 *	0. *	0 *	0. *	0 *	0. *	0 *	10938. *	1 *
* 145 *	0. *	0 *	10870. *	1 *	0. *	0 *	10724. *	1 *
* 146 *	0. *	0 *	10498. *	1 *	0. *	0 *	10165. *	1 *
* 147 *	0. *	0 *	9708. *	1 *	0. *	0 *	9093. *	1 *
* 148 *	0. *	0 *	8347. *	1 *	0. *	0 *	7397. *	1 *
* 154 *	0. *	0 *	0. *	0 *	0. *	0 *	9709. *	1 *
* 155 *	0. *	0 *	9652. *	1 *	0. *	0 *	9527. *	1 *
* 156 *	0. *	0 *	9343. *	1 *	0. *	0 *	9046. *	1 *
* 157 *	0. *	0 *	8677. *	1 *	0. *	0 *	8062. *	1 *
* *	* *	* *	* *	* *	* *	* *	* *	* *

REQUIRED REINFORCEMENT AROUND COLUMNS IN SQ.IN/FT

MINIMUM AMOUNT OF REINFORCEMENT= .39 SQ.IN/FT

X-DIRECTION

*	NEGATIVE X-FACE		**	POSITIVE X-FACE		*
*			**			*

*COLUMN	TOP	BOTTOM	TOP	BOTTOM		
*			**		*	*

* 28	.00	.00	.00	.14	*	*
* 29	.00	.14	.00	.13	*	*
* 30	.00	.13	.00	.13	*	*
* 31	.00	.12	.00	.11	*	*
* 37	.00	.00	.00	.15	*	*
* 38	.00	.15	.00	.15	*	*
* 39	.00	.15	.00	.14	*	*
* 40	.00	.14	.00	.13	*	*
* 41	.00	.12	.00	.10	*	*
* 47	.00	.00	.00	.17	*	*
* 48	.00	.17	.00	.16	*	*
* 49	.00	.16	.00	.15	*	*
* 50	.00	.15	.00	.14	*	*
* 51	.00	.13	.00	.12	*	*
* 52	.00	.10	.00	.09	*	*
* 57	.00	.00	.00	.18	*	*
* 58	.00	.18	.00	.17	*	*
* 59	.00	.17	.00	.16	*	*
* 60	.00	.16	.00	.15	*	*
* 61	.00	.14	.00	.13	*	*
* 62	.00	.11	.00	.10	*	*
* 63	.00	.08	.00	.06	*	*
* 68	.00	.00	.00	.18	*	*
* 69	.00	.18	.00	.18	*	*
* 70	.00	.18	.00	.17	*	*
* 71	.00	.16	.00	.16	*	*
* 72	.00	.15	.00	.13	*	*
* 73	.00	.12	.00	.11	*	*
* 74	.00	.09	.00	.07	*	*
* 79	.00	.00	.00	.19	*	*
* 80	.00	.19	.00	.18	*	*
* 81	.00	.18	.00	.17	*	*
* 82	.00	.17	.00	.16	*	*

CONTINUED FROM PAGE 36

* 83 *	.00 *	.15 **	.00 *	.14 *
* 84 *	.00 *	.13 **	.00 *	.11 *
* 85 *	.00 *	.09 **	.00 *	.07 *
* 90 *	.00 *	.00 **	.00 *	.19 *
* 91 *	.00 *	.19 **	.00 *	.18 *
* 92 *	.00 *	.18 **	.00 *	.18 *
* 93 *	.00 *	.17 **	.00 *	.16 *
* 94 *	.00 *	.15 **	.00 *	.14 *
* 95 *	.00 *	.13 **	.00 *	.11 *
* 96 *	.00 *	.09 **	.00 *	.07 *
* 101 *	.00 *	.00 **	.00 *	.19 *
* 102 *	.00 *	.19 **	.00 *	.18 *
* 103 *	.00 *	.18 **	.00 *	.17 *
* 104 *	.00 *	.17 **	.00 *	.16 *
* 105 *	.00 *	.15 **	.00 *	.14 *
* 106 *	.00 *	.13 **	.00 *	.11 *
* 107 *	.00 *	.09 **	.00 *	.07 *
* 112 *	.00 *	.00 **	.00 *	.18 *
* 113 *	.00 *	.18 **	.00 *	.18 *
* 114 *	.00 *	.18 **	.00 *	.17 *
* 115 *	.00 *	.16 **	.00 *	.16 *
* 116 *	.00 *	.15 **	.00 *	.13 *
* 117 *	.00 *	.12 **	.00 *	.11 *
* 118 *	.00 *	.09 **	.00 *	.07 *
* 123 *	.00 *	.00 **	.00 *	.18 *
* 124 *	.00 *	.18 **	.00 *	.17 *
* 125 *	.00 *	.17 **	.00 *	.16 *
* 126 *	.00 *	.16 **	.00 *	.15 *
* 127 *	.00 *	.14 **	.00 *	.13 *
* 128 *	.00 *	.11 **	.00 *	.10 *
* 129 *	.00 *	.08 **	.00 *	.06 *
* 134 *	.00 *	.00 **	.00 *	.17 *
* 135 *	.00 *	.17 **	.00 *	.16 *
* 136 *	.00 *	.16 **	.00 *	.15 *
* 137 *	.00 *	.15 **	.00 *	.14 *
* 138 *	.00 *	.13 **	.00 *	.12 *
* 139 *	.00 *	.10 **	.00 *	.09 *
* 144 *	.00 *	.00 **	.00 *	.15 *
* 145 *	.00 *	.15 **	.00 *	.15 *
* 146 *	.00 *	.15 **	.00 *	.14 *
* 147 *	.00 *	.14 **	.00 *	.13 *
* 148 *	.00 *	.12 **	.00 *	.10 *
* 154 *	.00 *	.00 **	.00 *	.14 *
* 155 *	.00 *	.14 **	.00 *	.13 *
* 156 *	.00 *	.13 **	.00 *	.13 *
* 157 *	.00 *	.12 **	.00 *	.11 *
* *	*	**	*	*

MAXIMUM MOMENTS AROUND COLUMNS AT ULTIMATE

UNITS ARE LB.FT/FT

Y-DIRECTION

* NEGATIVE Y-FACE *					* POSITIVE Y-FACE *				

COLUM	MAXIMUM	*LOAD*	MAXIMUM	*LOAD*	MAXIMUM	*LOAD*	MAXIMUM	*LOAD*	

NUMBER	NEG MOMENT	*CASE*	POS MOMENT	*CASE*	NEG MOMENT	*CASE*	POS MOMENT	*CASE*	

* 28 *	0.	* 0 *	5189.	* 1 *	0.	* 0 *	6697.	* 1 *	
* 29 *	0.	* 0 *	5113.	* 1 *	0.	* 0 *	6600.	* 1 *	
* 30 *	0.	* 0 *	4856.	* 1 *	0.	* 0 *	6283.	* 1 *	
* 31 *	0.	* 0 *	4386.	* 1 *	0.	* 0 *	5694.	* 1 *	
* 37 *	0.	* 0 *	7980.	* 1 *	0.	* 0 *	9088.	* 1 *	
* 38 *	0.	* 0 *	7868.	* 1 *	0.	* 0 *	8973.	* 1 *	
* 39 *	0.	* 0 *	7521.	* 1 *	0.	* 0 *	8623.	* 1 *	
* 40 *	0.	* 0 *	6918.	* 1 *	0.	* 0 *	8044.	* 1 *	
* 41 *	0.	* 0 *	6105.	* 1 *	0.	* 0 *	7269.	* 1 *	
* 47 *	0.	* 0 *	10027.	* 1 *	0.	* 0 *	10836.	* 1 *	
* 48 *	0.	* 0 *	9914.	* 1 *	0.	* 0 *	10728.	* 1 *	
* 49 *	0.	* 0 *	9577.	* 1 *	0.	* 0 *	10406.	* 1 *	
* 50 *	0.	* 0 *	9034.	* 1 *	0.	* 0 *	9889.	* 1 *	
* 51 *	0.	* 0 *	8292.	* 1 *	0.	* 0 *	9195.	* 1 *	
* 52 *	0.	* 0 *	7397.	* 1 *	0.	* 0 *	8347.	* 1 *	
* 57 *	0.	* 0 *	11510.	* 1 *	0.	* 0 *	12077.	* 1 *	
* 58 *	0.	* 0 *	11407.	* 1 *	0.	* 0 *	11978.	* 1 *	
* 59 *	0.	* 0 *	11102.	* 1 *	0.	* 0 *	11686.	* 1 *	
* 60 *	0.	* 0 *	10610.	* 1 *	0.	* 0 *	11208.	* 1 *	
* 61 *	0.	* 0 *	9945.	* 1 *	0.	* 0 *	10551.	* 1 *	
* 62 *	0.	* 0 *	9093.	* 1 *	0.	* 0 *	9707.	* 1 *	
* 63 *	0.	* 0 *	8063.	* 1 *	0.	* 0 *	8677.	* 1 *	
* 68 *	0.	* 0 *	12530.	* 1 *	0.	* 0 *	12889.	* 1 *	
* 69 *	0.	* 0 *	12435.	* 1 *	0.	* 0 *	12795.	* 1 *	
* 70 *	0.	* 0 *	12151.	* 1 *	0.	* 0 *	12517.	* 1 *	
* 71 *	0.	* 0 *	11683.	* 1 *	0.	* 0 *	12050.	* 1 *	
* 72 *	0.	* 0 *	11026.	* 1 *	0.	* 0 *	11386.	* 1 *	
* 73 *	0.	* 0 *	10166.	* 1 *	0.	* 0 *	10498.	* 1 *	
* 74 *	0.	* 0 *	9045.	* 1 *	0.	* 0 *	9343.	* 1 *	
* 79 *	0.	* 0 *	13148.	* 1 *	0.	* 0 *	13322.	* 1 *	
* 80 *	0.	* 0 *	13057.	* 1 *	0.	* 0 *	13231.	* 1 *	
* 81 *	0.	* 0 *	12781.	* 1 *	0.	* 0 *	12956.	* 1 *	

CONTINUED FROM PAGE 38

* 82 *	0. * 0 *	12315. * 1 *	0. * 0 *	12487. * 1 *
* 83 *	0. * 0 *	11640. * 1 *	0. * 0 *	11803. * 1 *
* 84 *	0. * 0 *	10723. * 1 *	0. * 0 *	10869. * 1 *
* 85 *	0. * 0 *	9526. * 1 *	0. * 0 *	9651. * 1 *
* 90 *	0. * 0 *	13406. * 1 *	0. * 0 *	13406. * 1 *
* 91 *	0. * 0 *	13316. * 1 *	0. * 0 *	13315. * 1 *
* 92 *	0. * 0 *	13041. * 1 *	0. * 0 *	13041. * 1 *
* 93 *	0. * 0 *	12571. * 1 *	0. * 0 *	12571. * 1 *
* 94 *	0. * 0 *	11882. * 1 *	0. * 0 *	11881. * 1 *
* 95 *	0. * 0 *	10937. * 1 *	0. * 0 *	10937. * 1 *
* 96 *	0. * 0 *	9708. * 1 *	0. * 0 *	9709. * 1 *
* 101 *	0. * 0 *	13320. * 1 *	0. * 0 *	13146. * 1 *
* 102 *	0. * 0 *	13229. * 1 *	0. * 0 *	13056. * 1 *
* 103 *	0. * 0 *	12955. * 1 *	0. * 0 *	12781. * 1 *
* 104 *	0. * 0 *	12487. * 1 *	0. * 0 *	12314. * 1 *
* 105 *	0. * 0 *	11802. * 1 *	0. * 0 *	11639. * 1 *
* 106 *	0. * 0 *	10869. * 1 *	0. * 0 *	10722. * 1 *
* 107 *	0. * 0 *	9651. * 1 *	0. * 0 *	9525. * 1 *
* 112 *	0. * 0 *	12886. * 1 *	0. * 0 *	12527. * 1 *
* 113 *	0. * 0 *	12793. * 1 *	0. * 0 *	12433. * 1 *
* 114 *	0. * 0 *	12514. * 1 *	0. * 0 *	12149. * 1 *
* 115 *	0. * 0 *	12049. * 1 *	0. * 0 *	11681. * 1 *
* 116 *	0. * 0 *	11385. * 1 *	0. * 0 *	11024. * 1 *
* 117 *	0. * 0 *	10496. * 1 *	0. * 0 *	10164. * 1 *
* 118 *	0. * 0 *	9342. * 1 *	0. * 0 *	9044. * 1 *
* 123 *	0. * 0 *	12074. * 1 *	0. * 0 *	11507. * 1 *
* 124 *	0. * 0 *	11975. * 1 *	0. * 0 *	11404. * 1 *
* 125 *	0. * 0 *	11683. * 1 *	0. * 0 *	11100. * 1 *
* 126 *	0. * 0 *	11206. * 1 *	0. * 0 *	10609. * 1 *
* 127 *	0. * 0 *	10549. * 1 *	0. * 0 *	9943. * 1 *
* 128 *	0. * 0 *	9705. * 1 *	0. * 0 *	9091. * 1 *
* 129 *	0. * 0 *	8677. * 1 *	0. * 0 *	8061. * 1 *
* 134 *	0. * 0 *	10834. * 1 *	0. * 0 *	10024. * 1 *
* 135 *	0. * 0 *	10724. * 1 *	0. * 0 *	9911. * 1 *
* 136 *	0. * 0 *	10403. * 1 *	0. * 0 *	9574. * 1 *
* 137 *	0. * 0 *	9887. * 1 *	0. * 0 *	9032. * 1 *
* 138 *	0. * 0 *	9193. * 1 *	0. * 0 *	8290. * 1 *
* 139 *	0. * 0 *	8345. * 1 *	0. * 0 *	7396. * 1 *
* 144 *	0. * 0 *	9086. * 1 *	0. * 0 *	7978. * 1 *
* 145 *	0. * 0 *	8970. * 1 *	0. * 0 *	7866. * 1 *
* 146 *	0. * 0 *	8621. * 1 *	0. * 0 *	7518. * 1 *
* 147 *	0. * 0 *	8042. * 1 *	0. * 0 *	6916. * 1 *
* 148 *	0. * 0 *	7268. * 1 *	0. * 0 *	6103. * 1 *
* 154 *	0. * 0 *	6696. * 1 *	0. * 0 *	5188. * 1 *
* 155 *	0. * 0 *	6599. * 1 *	0. * 0 *	5112. * 1 *
* 156 *	0. * 0 *	6282. * 1 *	0. * 0 *	4854. * 1 *
* 157 *	0. * 0 *	5692. * 1 *	0. * 0 *	4385. * 1 *
* *	* *	* *	* *	* *

REQUIRED REINFORCEMENT AROUND COLUMNS IN SQ.IN/FT

MINIMUM AMOUNT OF REINFORCEMENT= .39 SQ.IN/FT

Y-DIRECTION

* * * * *		* * * * *		* * * * *		* * * * *	
* NEGATIVE Y-FACE		* POSITIVE Y-FACE					
* * * * *		* * * * *		* * * * *		* * * * *	
* COLUMN	* TOP	* BOTTOM	* TOP	* BOTTOM	* TOP	* BOTTOM	* TOP

* 28	* .00	* .07	* .00	* .09	* .00	* .09	* .09
* 29	* .00	* .07	* .00	* .09	* .00	* .09	* .09
* 30	* .00	* .07	* .00	* .09	* .00	* .09	* .09
* 31	* .00	* .06	* .00	* .08	* .00	* .08	* .08
* 37	* .00	* .11	* .00	* .13	* .00	* .13	* .13
* 38	* .00	* .11	* .00	* .13	* .00	* .13	* .13
* 39	* .00	* .11	* .00	* .12	* .00	* .12	* .12
* 40	* .00	* .10	* .00	* .11	* .00	* .11	* .11
* 41	* .00	* .09	* .00	* .10	* .00	* .10	* .10
* 47	* .00	* .14	* .00	* .15	* .00	* .15	* .15
* 48	* .00	* .14	* .00	* .15	* .00	* .15	* .15
* 49	* .00	* .13	* .00	* .15	* .00	* .15	* .15
* 50	* .00	* .13	* .00	* .14	* .00	* .14	* .14
* 51	* .00	* .12	* .00	* .13	* .00	* .13	* .13
* 52	* .00	* .10	* .00	* .12	* .00	* .12	* .12
* 57	* .00	* .16	* .00	* .17	* .00	* .17	* .17
* 58	* .00	* .16	* .00	* .17	* .00	* .17	* .17
* 59	* .00	* .16	* .00	* .16	* .00	* .16	* .16
* 60	* .00	* .15	* .00	* .16	* .00	* .16	* .16
* 61	* .00	* .14	* .00	* .15	* .00	* .15	* .15
* 62	* .00	* .13	* .00	* .14	* .00	* .14	* .14
* 63	* .00	* .11	* .00	* .12	* .00	* .12	* .12
* 68	* .00	* .18	* .00	* .18	* .00	* .18	* .18
* 69	* .00	* .17	* .00	* .18	* .00	* .18	* .18
* 70	* .00	* .17	* .00	* .18	* .00	* .18	* .18
* 71	* .00	* .16	* .00	* .17	* .00	* .17	* .17
* 72	* .00	* .15	* .00	* .16	* .00	* .16	* .16
* 73	* .00	* .14	* .00	* .15	* .00	* .15	* .15
* 74	* .00	* .13	* .00	* .13	* .00	* .13	* .13
* 79	* .00	* .18	* .00	* .19	* .00	* .19	* .19
* 80	* .00	* .18	* .00	* .19	* .00	* .19	* .19
* 81	* .00	* .18	* .00	* .18	* .00	* .18	* .18
* 82	* .00	* .17	* .00	* .18	* .00	* .18	* .18

CONTINUED FROM PAGE 40

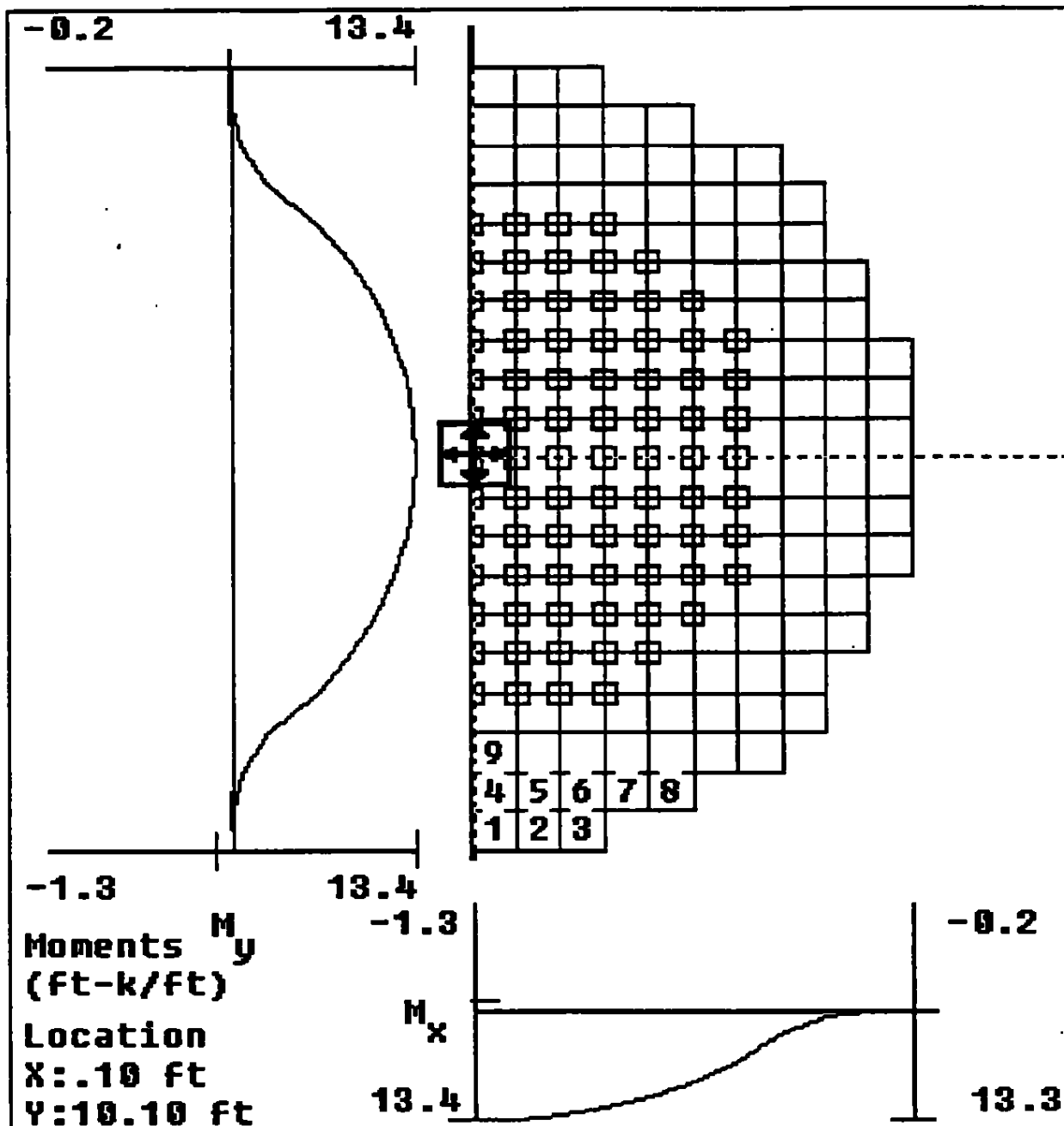
* 83 *	.00 *	.16 **	.00 *	.17 *
* 84 *	.00 *	.15 **	.00 *	.15 *
* 85 *	.00 *	.13 **	.00 *	.14 *
* 90 *	.00 *	.19 **	.00 *	.19 *
* 91 *	.00 *	.19 **	.00 *	.19 *
* 92 *	.00 *	.18 **	.00 *	.18 *
* 93 *	.00 *	.18 **	.00 *	.18 *
* 94 *	.00 *	.17 **	.00 *	.17 *
* 95 *	.00 *	.15 **	.00 *	.15 *
* 96 *	.00 *	.14 **	.00 *	.14 *
* 101 *	.00 *	.19 **	.00 *	.18 *
* 102 *	.00 *	.19 **	.00 *	.18 *
* 103 *	.00 *	.18 **	.00 *	.18 *
* 104 *	.00 *	.18 **	.00 *	.17 *
* 105 *	.00 *	.17 **	.00 *	.16 *
* 106 *	.00 *	.15 **	.00 *	.15 *
* 107 *	.00 *	.14 **	.00 *	.13 *
* 112 *	.00 *	.18 **	.00 *	.18 *
* 113 *	.00 *	.18 **	.00 *	.17 *
* 114 *	.00 *	.18 **	.00 *	.17 *
* 115 *	.00 *	.17 **	.00 *	.16 *
* 116 *	.00 *	.16 **	.00 *	.15 *
* 117 *	.00 *	.15 **	.00 *	.14 *
* 118 *	.00 *	.13 **	.00 *	.13 *
* 123 *	.00 *	.17 **	.00 *	.16 *
* 124 *	.00 *	.17 **	.00 *	.16 *
* 125 *	.00 *	.16 **	.00 *	.16 *
* 126 *	.00 *	.16 **	.00 *	.15 *
* 127 *	.00 *	.15 **	.00 *	.14 *
* 128 *	.00 *	.14 **	.00 *	.13 *
* 129 *	.00 *	.12 **	.00 *	.11 *
* 134 *	.00 *	.15 **	.00 *	.14 *
* 135 *	.00 *	.15 **	.00 *	.14 *
* 136 *	.00 *	.15 **	.00 *	.13 *
* 137 *	.00 *	.14 **	.00 *	.13 *
* 138 *	.00 *	.13 **	.00 *	.12 *
* 139 *	.00 *	.12 **	.00 *	.10 *
* 144 *	.00 *	.13 **	.00 *	.11 *
* 145 *	.00 *	.13 **	.00 *	.11 *
* 146 *	.00 *	.12 **	.00 *	.11 *
* 147 *	.00 *	.11 **	.00 *	.10 *
* 148 *	.00 *	.10 **	.00 *	.09 *
* 154 *	.00 *	.09 **	.00 *	.07 *
* 155 *	.00 *	.09 **	.00 *	.07 *
* 156 *	.00 *	.09 **	.00 *	.07 *
* 157 *	.00 *	.08 **	.00 *	.06 *
* *	*	**	*	*

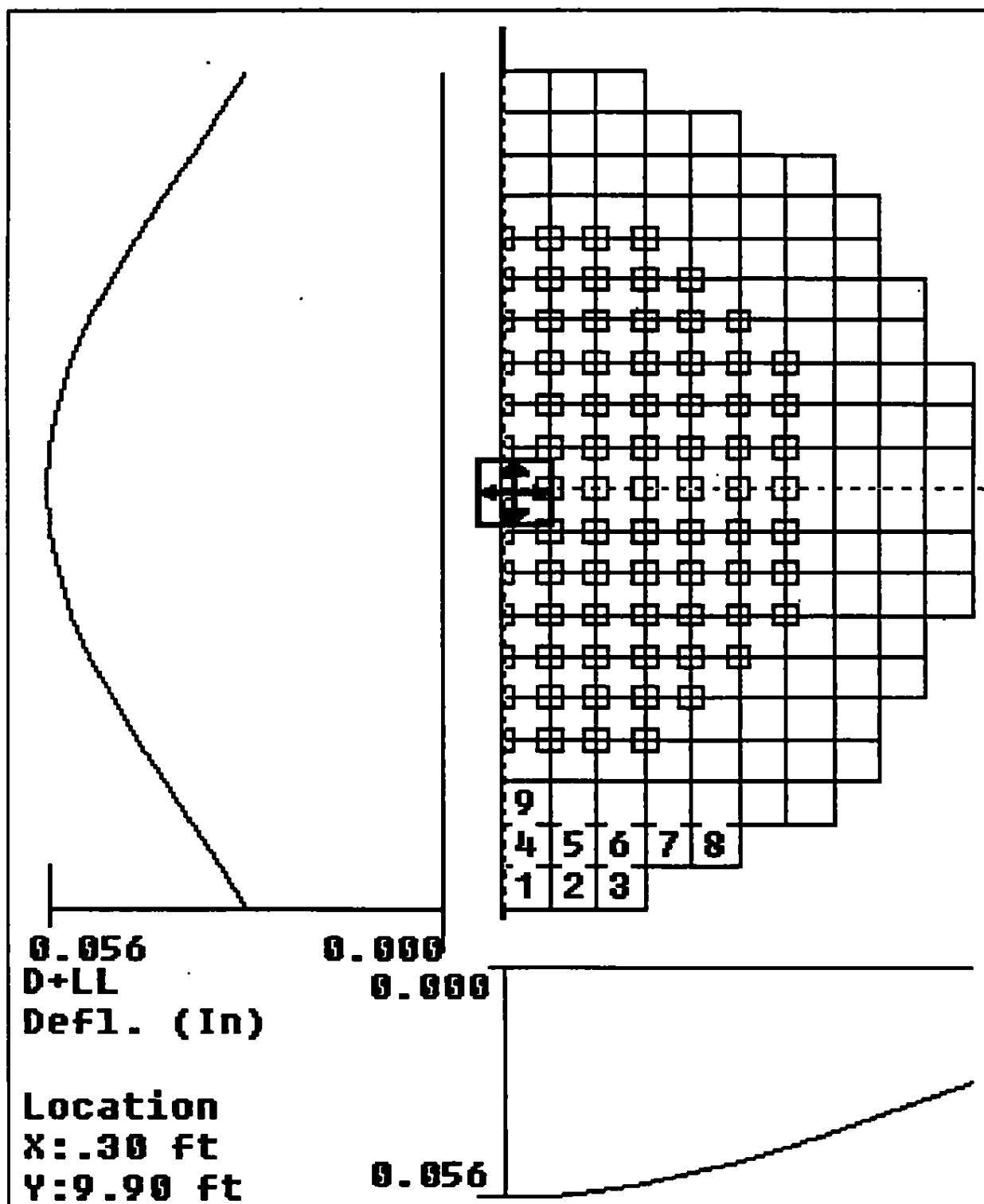
BACK-SUBSTITUTED UPWARD FORCE TO TOTAL LOAD

```
*****
* Upward Force * Total Load * Accuracy % *
* F (KIPS) * P (KIPS) * F/P x 100 *
*****
*          *          *          *
*      255.22 *      255.17 *    100.017 *
*          *          *          *
*****
```

Note: Accuracy should be equal to or less than 100% +
+ -0.1%,
unless Restrained or Uplift nodes are present.

* Program completed as requested *





To: V. Diaz Date: April 9, 1992

Location: Fortier Copy to: A. Junker
J. Kivas
J. Meyer
P. Savoy
J. Schneller
F. Whitley

From: G. C. A. Rich

Location: Fortier

Extension: 6248

Subject: INJECTED WASTE ANALYSIS

Reference: NB 1166, pp. 25-29 (GCR); NB 1148, pp. 194, 196-197 (JEM); GC-MS Files
D:\CHEMPC\DATA\M1223.D-M1228.D (VD)

File Name: DEEPWELL 92/03

Contributors: V. Diaz, J. Meyer, QA Group

SAMPLE DESCRIPTION

Analysis was performed on composites of samples collected on February 25, 26 and March 2, 1992 in general accordance with EPA methodology.

1. Waste Acid Composite (2/25,26/92 and 3/2/92) Lab #84182463
2. Waste Water Composite (2/25,26/92 and 3/2/92) Lab #84182464.
3. MET Composite (2/25,26/92 and 3/2/92) Lab #84182461
4. NSB Composite (2/25,26/92 and 3/2/92) Lab #84182462

SAMPLE HISTORY

Comprehensive knowledge of the character and composition of these materials is necessary for environmental and tax purposes prior to deep well injection.

RESULTS

	<u>Waste Acid Composite</u>	<u>Waste Water Composite</u>	<u>MET (T-500) Composite</u>	<u>NSB Compos:</u>
Specific Gravity at:				
70°F	--	--	0.996	0.99
100°F	--	1.050	--	--
140°F	1.457	--	--	--
Total Solids, %	70.52	12.01	0.81	0.67
Total Suspended Solids, ppm	22	13	1	7
Total Kjeldahl Nitrogen, as N, %	6.0	2.20	0.22	0.18

-2-

	<u>Waste Acid Composite</u>	<u>Waste Water Composite</u>	<u>MET (T-500) Composite</u>	<u>NSB Composite</u>
Ammonia Nitrogen, as N, %	5.62	1.88	0.05	0.02
Organic Nitrogen, as N, %	0.38	0.32	0.17	0.16
Total Cyanide as CN, ppm	--	219	651	18
Amenable Cyanide, ppm	--	137	639	9.9
Cyanohydrin Cyanide, ppm	--	1430	142	27
Sulfate, as SO ₄ , %	60.05	6.75	0.04	0.01
Sulfuric Acid, %	39.2	1.27	--	--
Water, %	28.61	--	--	--
Total Organic Carbon (TOC), %	2.32	1.56	1.58	0.50
ADSA, %	1.83	--	--	--
<u>Metals</u>				
Molybdenum, ppm	--	119	8.4	7.1
Nickel, ppm	--	0.9	0.4	0.3
Cobalt, ppm	--	3.6	0.7	0.6
<u>Organics</u>				
Acetone, ppm	510	<10	290	<10
Acrylamide, ppm	--	910	190	7
Acrylic Acid, ppm	--	7400	370	470
Acrylonitrile, ppm	--	330	12	<10
Acetonitrile, ppm	--	790	7300	<10
Methanol, ppm	7800	390	620	20
MMA, ppm	355	<10	32	<10
Toluene, ppm	--	<0.01	7.7	<0.01
Methacrylic acid, ppm	970	75	260	25

-3-

	<u>Waste Acid Composite</u>	<u>Waste Water Composite</u>	<u>MET (T-500) Composite</u>	<u>NSB Composite</u>
Fumaronitrile, ppm	--	1100	<50	130
Succinonitrile, ppm	--	1600	1500	2200
Benzene, ppm	--	<0.01	0.03	<0.01
MAI, ppm	130	<10	<10	<10
--Not required				

G. C. A. Rich
G. C. A. Rich

GCAR:mkp
(040801)

TERA Report No. 94-100-054-02

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT
INSTALLATION ASSESSMENT
NSB BACKWASH TANK 100-6**

For

**CYTEC INDUSTRIES
Westwego, Louisiana**



TERA, Inc.

3100 South Gessner Road, Suite 650
P.O. Box 770039, Houston, Texas 77215-0039, Tel. (713) 783-6292, Fax (713) 783-3698

94-100-054-02

HAZARDOUS WASTE TANK SYSTEM
MODIFICATION INSTALLATION CERTIFICATION

I have performed the assessment for the installation of a replacement for the NSB Backwash Tank (100-6) at the CYTEC Industries Fortier Plant in Westwego, Louisiana. The work performed is described and documented in the attached TERA, Inc. report No. 94-100-054-02 dated December 9, 1994. These assessments were performed to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 265.192 (b-f) and the corresponding requirements of LAC 33:V.4435 (b-f).

With regard to this duty, I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all related attachments and that, based on my observations and my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Thomas H. Wimbrow

Registered Professional Engineer

Louisiana No. 23062

TERA, Inc.

P. O. Box 770039

Houston, Texas 77215-0039

Signed: Thomas H. Wimbrow

Date: Dec. 13, 1994



TERA, Inc.

3100 South Gessner Road, Suite 650
P.O. Box 770039, Houston, Texas 77215-0039, Tel. (713) 783-6292, Fax (713) 783-3698

December 9, 1994
94-100-054-02

Ms. Stacy McCoy
CYTEC Industries
10800 River Road
Westwego, Louisiana 70094

Subject: Replacement Component
Installation Assessment for
NSB Backwash Tank 100-6

Dear Ms. McCoy:

Submitted here is our installation assessment report for the installation of a replacement for the NSB Backwash Tank (100-6). This work was performed at CYTEC's Fortier Plant in Westwego, Louisiana.

The main report body summarizes assessment results in a format corresponding to the rules being addressed. Detailed information and documentation are presented in an Appendix.

We have enjoyed working with you on this interesting project, and look forward to another opportunity to be of service to CYTEC. Please contact us at 713/783-6292 if you have any questions.

Very truly yours,

TERA, Inc.

Thomas H. Wimbrow, P.E.
Project Manager

THW/da

Attachment: TERA Report No. 94-100-054-02

DEC 13, 1994

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT
INSTALLATION ASSESSMENT
NSB BACKWASH TANK 100-6**

* * *

To

**CYTEC INDUSTRIES
Westwego, Louisiana**

* * *

By

**TERA, Inc.
Houston, Texas**

December 1994

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
DESCRIPTION OF REPLACEMENT	1
INSTALLATION ASSESSMENT	2
UNDERGROUND COMPONENTS	2
TIGHTNESS TEST	3
ANCILLARY EQUIPMENT	3
CORROSION PROTECTION	3
CONCLUSIONS OF ASSESSMENT	4

APPENDIX - Inspection Documentation

HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT
INSTALLATION ASSESSMENT
NSB BACKWASH TANK 100-6

This report documents the installation assessment performed for the installation of a replacement for the NSB Backwash Tank (100-6) at the CYTEC Industries Fortier Plant in Westwego, Louisiana. These assessments were performed and this report was prepared to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 265.192 (b-f) and the corresponding requirements of LAC 33:V.4435 (B-F).

DESCRIPTION OF REPLACEMENT

The replacement NSB Backwash Tank (equipment item no. 100-6) is a 12'-1 1/2" inside diameter by 24'-0" high vertical tank with a flat bottom and a cone roof. It is constructed of welded carbon steel and has a capacity of 19,000 gallons (with two feet of freeboard to the top of the shell). It is supported by a reinforced concrete foundation that has tank bottom leak detection features and is located inside a concrete secondary containment area. The new tank was installed as a replacement for a similar tank previously used for this service. The previous tank was closed under LA DEQ Closure Permit No. LAD007175390-CP3.

An assessment of the design of the replacement tank and the associated piping and other ancillary equipment items installed along with it was performed previously by TERA and is documented in TERA Report No. 91-129. The scope of this report is limited to assessment of the installation and leak testing of the replacement tank and it's associated new piping and other ancillary equipment items.

INSTALLATION ASSESSMENT (40 CFR 265.192(b))

An installation assessment was performed by TERA to:

- a) verify correspondence between the system design documentation, applicable standards and the actual condition of the system, and
- b) detect installation damage, defective construction or other defects in the new system components.

Assessment methods used included visual inspection, ultrasonic thickness measurement, and hydrostatic and pneumatic leak testing of the tank and ancillary equipment items following completion of installation. Documentation of the inspection and testing performed is included in the Appendix of this report.

Visual inspections were made of the exterior of the tank, the tank foundation, and the system ancillary equipment components. These inspections verified that the installation and arrangement of the new tank system components was consistent with the design documentation in the referenced design assessment.

With the exception of a cracked fitting on the tank discharge pump which was repaired during the inspection, no defects in materials or fabrication; no evidence of installation damage; and no weld breaks, punctures, leaks, cracks, corrosion, or other deterioration were observed during the inspection and testing of the replacement tank and ancillary equipment installation.

UNDERGROUND COMPONENTS (40 CFR 265.192(c))

The NSB Backwash Tank system does not include any underground components.

TIGHTNESS TEST (40 CFR 265.192(d))

The replacement tank and all of the new piping and ancillary equipment items installed were tested for tightness prior to the system being placed into service. The tightness testing consisted of hydrostatic and pneumatic testing of the replacement tank in accordance with API 650 specifications and hydrostatic testing of the new piping and other ancillary equipment items in accordance with ANSI B31.3 requirements. Documentation of the testing performed is included in the Appendix. Minor leaks disclosed during testing were satisfactorily repaired. There was no evidence of leakage from any system component during final tightness testing.

ANCILLARY EQUIPMENT (40 CFR 265.192(e))

The replacement tank ancillary equipment includes the new piping, pump, valves, instruments, and controls installed to connect the replacement tank to existing waste system components. All of the new ancillary equipment items are located within the existing tank secondary containment vault area or on structural steel pipe racks. This location provides protection against physical damage and isolation from vehicle-induced loads. The new piping, pump, valves, and other components are supported by the tank or structural steel or concrete supports. The support for the new system ancillary items meets the support requirements of ANSI B31.3 and will provide satisfactory protection against settlement, vibration, expansion and contraction.

CORROSION PROTECTION (40 CFR 265.192(f))

The replacement tank is constructed of carbon steel and the new system ancillary equipment components are constructed of carbon steel or better materials. Past experience with the waste has shown that the waste being handled is compatible

CORROSION PROTECTION (40 CFR 265.192(f)) (Continued)

with and not excessively corrosive to those materials. The new system components will not be in contact with soil or groundwater. Therefore, cathodic protection or other additional corrosion protection is not required.

CONCLUSIONS OF ASSESSMENT

The assessments and inspections performed and the information presented above and included in the Appendix of this report confirm that the replacement NSB Backwash Tank (Equipment Item 100-6) at the CYTEC Industries Fortier Plant in Westwego, Louisiana has been installed in accordance with the system design documentation and applicable specifications. Inspections and testing for inadequate construction, damage, and tightness revealed no unrepaired leaks or significant defects in the replacement tank or other new system components. The installation therefore satisfies the requirements of 40 CFR 265.192(b-f), and the corresponding requirements of LAC 33:V.4435(B-F).

APPENDIX
Inspection Documentation

APPENDIX
Inspection Documentation

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
TERA New Containment Inspection Record (4/14/94)	1
TERA New Tank Inspection Record (7/20/94)	2
TERA Thickness Measurement Record (7/20/94)	3
TERA Leak Test Record (7/20/94)	4
TERA Piping Inspection Record (9/9/94)	5
TERA Pump Inspection Record (9/9/94)	6
TERA Leak Test Record (9/9/94)	7

NEW CONTAINMENT INSPECTION RECORD

Sheet: 1 of 1
Job No.: 94-100-054-02
Date: 4/14/94
By: THW
CLIENT: Cytec Industries
PLANT LOCATION: Westwego, Louisiana
TYPE: Concrete Foundation
LEAK DETECTION TYPE: Visual (pipes to holding pots) YEAR BUILT: Repaired 1994
SERVICE: Tank Bottom Leak Detection for Replacement NSB Backwash Tank 100-6
CAPACITY: Not Applicable LARGEST TANK CAPACITY: 19,000 gal

	<u>ROOF</u>	<u>SHELL</u>	<u>FLOOR</u>
CONSTRUCTION MATLS:	None	Reinforced Concrete	Reinforced Concrete
INTERIOR COATING/LINING OF CONTAINMENT:			HDPE Liner
EXTERIOR COATING/LINING OF PRIMARY COMPONENT:	Paint		
JOINT TREATMENTS:	None		
WALL/SHELL CONDITION:	Satisfactory		
ROOF/TOP HEAD CONDITION:	None		
BOTTOM/BOTTOM HEAD CONDITION:	Satisfactory		
SUPPORT TYPE:	Slab on grade		
FOUNDATION CONDITION:	Satisfactory		
INTERNAL STRUCTURE CONDITION:	Liner and gravel satisfactory		
JOINT CONDITION:	Satisfactory		
LINING/COATING CONDITION:	Satisfactory		
LIQUID REMOVAL METHOD:	Manual (gravity drain to pots)		
SIGNS OF CRACKS:	None		
SIGNS OF PUNCTURES:	None		
SIGNS OF CRACKS OR MATERIAL DAMAGE:	None		
SIGNS OF CORROSION:	None		
SIGNS OF OTHER STRUCTURAL DAMAGE OR PROBLEMS:	None		
OPERATING CONDITIONS:	MAX TEMP: Amb.	MAX PRESS: Atm.	VAC: No
REFERENCE INSPECTION RECORDS:			

COMMENTS: Concrete foundation and anchor bolts have been satisfactorily repaired after damage caused by overstressing of some anchor bolts during previous attempt to hydrotest tank. Foundation, HDPE leak detection liner, drain pipes, and pea gravel fill all appear per design drawing.

NEW TANK INSPECTION RECORD

CLIENT: Cytec Industries
 PLANT LOCATION: Westwego, Louisiana
 TYPE INSPECTION: External
 ITEM NO.: 100-6 CODE: API 650 Appendix F
 SHEET: 1 of 1
 JOB NO.: 94-100-054-02
 DATE: 7/20/94
 BY: THW
 YEAR BUILT: 1993

SERVICE: Remplacement NSB Backwash Tank

CAPACITY: 19,000 gallons TANK/DRUM TYPE: Vertical Cone Roof

	<u>ROOF/TOP HD.</u>	<u>WALL/SHELL</u>	<u>FLOOR/BOT.HD.</u>	<u>JACKET</u>
MATLS:	Carbon Steel	Carbon Steel	Carbon Steel	None

SHELL CONDITION: Satisfactory

ROOF CONDITION: Satisfactory

BOTTOM CONDITION: Satisfactory visual portion

JACKET CONDITION: None

SUPPORT TYPE: Concrete pad

FOUNDATION CONDITION: Satisfactory

INTERNAL STRUCTURE CONDITION: None

WELDED/FLANGED JOINT CONDITION: Satisfactory

NOZZLE CONDITION: Satisfactory

LINING/COATING CONDITION: External paint satisfactory, some minor nicks

INSULATION CONDITION: None

SIGNS OF CRACKS: None

SIGNS OF PUNCTURES: None

SIGNS OF COATING DAMAGE: None

SIGNS OF CRACKS/MATERIAL DAMAGE: None

SIGNS OF CORROSION: None

SIGNS OF OTHER STRUCTURAL DAMAGE OR PROBLEMS: None

TEST? Yes TYPE: API 650 App. F RESULTS: Satisfactory

OPERATING CONDITIONS: MAX TEMP: Amb MAX PRESS: 4 in. WC VAC: No

REFERENCE INSPECTION RECORDS: Thickness Measurement Record 7/20/94

Leak Test Record 7/20/94

COMMENTS: Tank bottom and anchor chairs have been satisfactorily repaired after having been damaged by overpressuring of tank during previous attempt at hydrotest. Bottom replaced and anchor chairs rewelded. Tank appears visually satisfactory.

THICKNESS MEASUREMENT RECORD

CLIENT: Cytec Industries
 PLANT LOCATION: Westwego, Louisiana

SHEET: 1 of 1
 JOB NO.: 94-100-054-02
 DATE: 7/20/94
 BY: THW

Tank No.: Replacement 100-6
 NSB Backwash Tank

NOZZLES		
LOCATION	SIZE	THICK.
Manway	30"	0.419
MW ht.	2"	0.388
Steam out	2"	0.388
Steam out	2"	0.391
North low	3"	0.492
Steam out	2"	0.364
West low	3"	0.464
West low	1.5"	0.317
West low	3"	0.456
Steam out	2"	0.367
MW ht.	6"	0.465
Roof Vent	16"	0.401
Roof N2 In	2"	0.379
Roof Vent	2"	0.393
Roof Xmtr	3"	0.509

SHELL AND HEADS				
LOCATION	POSITION			
	N	E	S	W
Shell course 1 - 6"	0.379	0.396	0.397	0.410
Shell course 1 - 4'	0.417	0.399	0.406	0.421
Shell course 3 - Top			0.389	0.390
Roof	0.426	0.435	0.422	0.425
Floor Edge	0.426	0.412	0.438	0.424

COMMENTS: Measurements taken with Stresstel T-2000 digital thickness meter calibrated with 0.250 inch carbon steel block. Measurements are in inches and include apparent paint thickness. Shell manway location called "S". Tank has eight anchor chairs and 1" dia. stainless steel anchor bolts with double nuts.

TERA, INC.
LEAK TEST RECORD

4

CLIENT:	CYTEC Industries	SHEET:	1 of 1
PLANT LOCATION:	Westwego, Louisiana	JOB NO.:	94-100-054-02
COMMENTS:		DATE:	7/20/94
		BY:	THW

=====

ITEM TESTED: Replacement NSB Backwash Tank 100-6

NORMAL OPERATING PRESSURE: 3 - 4 in. WC

RELIEF PRESSURE: 2-1/2 psi max DESIGN PRESSURE: 2-1/2 psig

TEST TYPE: API 650 Appendix F - Hydrostatic and Pneumatic

TEST PRESSURE: See below TEST DURATION: 2+ hrs.

TEST RESULTS: Satisfactory CHART NO.: None

WITNESSED BY: THW DATE: 7/20/94

COMMENTS: Testing performed in accordance with API 650 Appendix F specifications. Tank was filled to overflowing with water and pressurized to 1.25 times design pressure (DP=2.5 psi; test 3.125 psi). All tank joints, seams, and connections examined with no evidence of leakage. Water was drained from tank to maximum extent possible (3 to 4 inches remaining in tank) and tank repressured to design pressure (plus 4 in. WC to compensate for water heel). All tank joints, seams, and connections again examined with no evidence of leakage or of tank or foundation distress. All testing accepted as satisfactory.

PIPING INSPECTION RECORD

SHEET: 1 of 1

CLIENT: CYTEC INDUSTRIES

Job No.: 94-100-054-02

PLANT LOCATION: Westwego, Louisiana

Date: 09/09/94

By: THW

COMMENTS: Visual inspection of new pipe, joints, and flanged connections for Replacement NSB Backwash Tank. See also leak test record 09-09-94. Piping is carbon steel. Installation is per design drawings.

DESCRIPTION	SIZE	VISUAL	TEST	COMMENTS
Tank Inlet (backwash from NSB filters)	6"	OK	OK	
Pump Inlet from 100-6	3"	OK	OK	Pump seal flush nipple replaced
Pump Outlet to MET System	2"	OK	OK	
Tank Vent to Flare	3"	OK	No	

PUMP INSPECTION RECORD

CLIENT: Cytec Industries
PLANT LOCATION: Westwego, Louisiana

Sheet: 1 of 1
Job No.: 94-100-054-02
Date: 9/9/94
By: THW

COMMENTS:

=====

DESCRIPTION: New NSB Backwash Tank Discharge Pump

PUMP NO.: BMD-9645 MODEL NO.: Goulds 3196

SIZE: 1-1/2 x 3 x 8 S/N: 760D193

RPM: 3600 GPM: 75 HEAD H₂O: 175 S.G.: 0.82

LEAKS NOTED: Seal flush connection (repaired during inspection)

GENERAL CONDITION: New, satisfactory

COMMENTS: 6.25 in. dia. impeller; 15 HP driver. Grouted steel baseplate with drain. Pump not in operation, no electrical hook-up at time of inspection. Pipe nipple at shaft seal flush connection appeared to have been stepped on and was cracked. Nipple was replaced during inspection.

TERA, INC.
LEAK TEST RECORD

7

CLIENT:	CYTEC Industries	SHEET:	1 of 1
PLANT LOCATION:	Westwego, Louisiana	JOB NO.:	94-100-054-02
COMMENTS:		DATE:	9/9/94
		BY:	THW

=====

ITEM TESTED: Piping for Replacement NSB Backwash Tank 100-6

NORMAL OPERATING PRESSURE: less than 30 psi

RELIEF PRESSURE: None DESIGN PRESSURE: 150 lb. class

TEST TYPE: Hydrostatic

TEST PRESSURE: 60 psi TEST DURATION: 15+ min.

TEST RESULTS: Satisfactory CHART NO.: None

WITNESSED BY: THW DATE: 9/9/94

COMMENTS: All new system piping (tank and pump inlet and pump discharge) tested at one time using piping connections. Pipe nipple connection to pump shaft seal flush was cracked (appeared to have been stepped on). Nipple was replaced prior to start of test. All joints, seams and connections examined during test with no evidence of leakage observed.

TERA Report No. 95-100-031-A

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT
DESIGN ASSESSMENT
WASTE WATER SECONDARY FILTER F-401C**

For

**CYTEC INDUSTRIES
Westwego, Louisiana**



TERA, Inc.

3100 South Gessner Road • Suite 650 • Houston, Texas 77063
P.O. Box 770039 • Houston, Texas 77215-0039
Tel. (713) 783-6292 • Fax (713) 783-3698

95-100-031-A

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT DESIGN ASSESSMENT**

I have performed the design review of the proposed replacement of Waste Water Secondary Filter F-401c at the Cytec Industries Fortier Plant in Westwego, Louisiana. This work, as described in attached TERA, Inc. Report No. 95-100-031-A dated June 14, 1995, was performed to assess compliance with the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 and 40 CFR 264.193 and the corresponding State of Louisiana requirements in LAC 33:V.1905 and LAC 33:V.1907.

With regard to the above duty, I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all related attachments and that, based on my observations and my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Thomas H. Wimbrow

Registered Professional Engineer

Louisiana No. 23062

TERA, Inc.

P.O. Box 770039

Houston, Texas 77215-0039

Signed: Thomas H. Wimbrow

Date: JUNE 14, 1995



TERA, inc.

3100 South Gessner Road • Suite 650 • Houston, Texas 77063
P.O. Box 770039 • Houston, Texas 77215-0039
Tel. (713) 783-6292 • Fax (713) 783-3698

June 14, 1995
95-100-031-A

CYTEC INDUSTRIES
10800 River Road
Westwego, Louisiana 70094

Attention: Ms. Stacy Foret

**Subject: Replacement Waste Water Secondary Filter F-401c
Design Assessment Report**

Dear Ms. Foret:

Submitted here is our design assessment report for the proposed replacement of Waste Water Secondary Filter F-401c at Cytec's Fortier Plant. The body of the report summarizes the assessment results in a format corresponding to the rules being addressed. Documentation and calculations are presented in the Appendix of the report.

As we have discussed, TERA concurs with Cytec's position that this replacement of an existing vessel meets the criteria given in LAC 33:V.322.G.3 for a Class I permit modification since the replacement vessel will:

- 1) Meet the same design and inspection standards as the original (ASME Code and API 510);
- 2) have a capacity within +/- 10 percent of that of the replaced vessel;
- 3) have a capacity difference from the original vessel of less than 1500 gallons;
- 4) not increase the facility's permitted tank capacity; and
- 5) meet the maximum operating pressure and temperature conditions specified in the permit for Waste Water Secondary Sand Filter service (i.e. those for F-401d).

Ms. Stacy Foret
CYTEC INDUSTRIES
Page 2

TERA, Inc.
June 14, 1995
95-100-031-A

We would also like to confirm that the "Nominal Original Shell Thickness" will remain unchanged, but that the "Shell Thickness Required for Pressure" and "Minimum Allowable Shell Thickness" for the replacement F-401c will be lower than that of the original vessel due to the change in the material of construction. It should also be noted that the "Capacity" of this vessel (defined as the amount of waste it holds when in operation) is considerably less than the inside volume of the vessel (as calculated in the report Appendix) due to the volume displaced by the vessel internal structural components and the sand filter media.

We appreciate your continued confidence in TERA as a participant in Cytec's environmental compliance efforts, and look forward to another opportunity to be of service. Please contact us at 713/783-6292 if you have any questions.

Very truly yours,

TERA, Inc.



Thomas H. Wimbrow, P.E.
Vice President and Chief Engineer

THW/da
Attachment: TERA Report No. 95-100-031-A

JUNE 14, 1995

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT DESIGN ASSESSMENT
WASTE WATER SECONDARY FILTER F-401C**

* * *

**CYTEC INDUSTRIES
Fortier Plant
Westwego, Louisiana**

* * *

**TERA, Inc.
Houston, Texas**

June, 1995

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
DESCRIPTION OF REPLACEMENT COMPONENT	1
CONSIDERATIONS OF DESIGN ASSESSMENT	2
1. Design Standards	2
2. Hazardous Characteristics of the Waste	3
3. Corrosion Protection	3
4. Protection from Vehicular Traffic	4
5. Foundation Design and Structural Support	4
6. Structural Strength and Seams	5
7. Connections	5
8. Pressure and Overfill Controls	6
9. Ancillary Equipment	6
SECONDARY CONTAINMENT	6
CONCLUSIONS OF ASSESSMENT	7

Appendix - Design and Review Documentation

HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT
DESIGN ASSESSMENT

This report documents the design assessment which was performed for the proposed replacement of the existing Waste Water Secondary Sand Filter F-401c at the Cytec Industries Fortier Plant in Westwego, Louisiana. This assessment was performed and this report was prepared to verify and document compliance with the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 and 40 CFR 264.193 and the corresponding State of Louisiana requirements in LAC 33:V.1905 and LAC 33:V.1907.

DESCRIPTION OF REPLACEMENT COMPONENT

Waste Water Secondary Sand Filter F-401c is a vertical pressure vessel with dished heads which is 7 feet in diameter and 11 feet high. Cytec intends to replace the existing rubber-lined carbon steel filter vessel with an essentially identical vessel constructed of stainless steel. The existing filter is being replaced because it is approaching the end of its reliable service life. The replacement filter will be the same as the old one with the following exceptions:

- 1) It will be constructed of stainless steel to provide improved integrity and compatibility with the waste without the need for a rubber lining.
- 2) The replacement vessel heads will be industry standard 2:1 ellipsoidal shape instead of the ASME torispherical shape used on the old filter.
- 3) The lower head manway will be located off the vessel centerline to improve maintenance access to the filter media.

DESCRIPTION OF REPLACEMENT COMPONENT (Continued)

Design pressure for both the existing and replacement vessels is 100 psig. The design temperature of the replacement vessel will be 200 degrees F to meet the service requirements and match the design temperature of the existing stainless steel secondary sand filter F-401d, which is in the same service. Since the dimensions and configuration of the original and replacement filters will be essentially identical, it will not be necessary to change any of the waste system piping or other ancillary equipment to install the replacement filter.

CONSIDERATIONS OF DESIGN ASSESSMENT

1. Design Standards

The design of the replacement filter was reviewed for compliance with the following design codes:

- American Society of Mechanical Engineers, ASME/ANSI *Boiler and Pressure Vessel Code*, Section VIII, Division 1
- American Society of Civil Engineers, ASCE Standard 7-88, *Minimum Design Loads for Buildings and Other Structures*

The design review performed indicates that:

- The above design standards are appropriate for this application; and
- The design of the replacement filter will conform to the standards referenced above.

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)

1. Design Standards (Continued)

The conclusion of the review performed is that the design of the replacement filter will be appropriate for the intended service. The structural strength, support, seams, and pressure controls will be satisfactory for the service.

2. Hazardous Characteristics of the Waste

The material which will be handled by the replacement filter is a waste water stream resulting from the manufacture of acrylonitrile. The EPA hazardous waste number for this material is K011. The EPA Hazard Codes for this material are Reactive and Toxic (R and T). Additional waste characterization data provided by Cytec is included in the Appendix of this report.

3. Corrosion Protection

The replacement filter will not be in contact with soil or groundwater. Therefore, corrosion-resistant materials of construction, a corrosion-resistant coating with cathodic protection, or electrical isolation devices are not required for protection from soil or groundwater-induced corrosion.

The exterior of the replacement filter will be protected from atmospheric corrosion by its stainless steel material of construction. All of the new filter components which will be in contact with the waste will be

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)

3. **Corrosion Protection (Continued)**

constructed of stainless steel. Review of the waste composition and past experience at this facility has confirmed that the waste material is compatible with and not corrosive to the materials of construction specified.

In summary, review of the corrosion protection measures and materials of construction used indicates that they should provide satisfactory protection from corrosion and adequate service life.

4. **Protection from Vehicular Traffic**

The replacement filter will be located aboveground inside a secondary containment area with reinforced concrete walls. The replacement filter will therefore not be subject to loads or damage from vehicular traffic.

5. **Foundation Design and Structural Support**

The replacement filter will be supported by structural steel legs. The leg design will be identical to that of the existing filter. The existing filter legs and the anchorage to the existing reinforced concrete foundation below the filter have provided many years of satisfactory support to the existing filter. The new legs should therefore provide satisfactory support for the full weight of the replacement filter and its contents.

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)

5. Foundation Design and Structural Support (Continued)

The replacement filter will be located above ground at an elevation above the containment area wall so the filter is not located in a saturated zone and special anchorage to resist flotation or dislodgement is not required. The replacement filter will be located in a zone of low seismic activity (Zone 0 from ASCE 7-88) so special earthquake anchorage provisions are not required. The replacement filter will be aboveground and so will not be subject to excessive stress or damage from frost heave.

6. Structural Strength and Seams

The replacement filter will be designed and constructed in accordance with the requirements of the *ASME Boiler and Pressure Vessel Code*. Compliance with Code requirements will ensure that the structural strength and seams of the vessel are satisfactory for their service. Calculations confirming compliance of the replacement vessel with basic Code requirements are included in the Appendix of this report.

7. Connections

The replacement filter nozzle-to-vessel and flanged piping connections will be designed and constructed in accordance with the requirements of the *ASME Boiler and Pressure Vessel Code*. Compliance with Code requirements will ensure that the vessel connections are satisfactory for their service.

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)

8. Pressure and Overfill Controls

The replacement Secondary Sand Filter is a pressure vessel designed for 100 psig operating pressure. It will be protected from overpressure by a relief valve attached to the filter inlet piping. The filter is sealed and designed to operate full of liquid, so it is not subject to spills caused by overfilling.

9. Ancillary Equipment

No changes will be necessary or made in the existing system ancillary equipment as part of the filter replacement.

SECONDARY CONTAINMENT ASSESSMENT

The replacement filter will be located aboveground and will use all welded joints and welded flanges. The filter and all its connections will be accessible for daily visual inspection for the detection of leakage. The replacement filter will also be located inside an existing secondary containment vault.

The filter containment vault has been designed to prevent migration of wastes or accumulated liquid out of the system to the soil, ground water, or surface water at any time. The containment vault is capable of collecting releases and accumulated liquids for visual detection and capable of holding them until the collected material is removed.

SECONDARY CONTAINMENT ASSESSMENT (Continued)

The filter containment vault is constructed of a material (reinforced concrete) that is compatible with the wastes being stored. The long-term satisfactory performance of the existing vault has demonstrated that it has sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste, climatic conditions, and the stress of daily operation. The satisfactory performance of the vault foundation has also demonstrated that it is capable of providing support to the secondary containment system and resistance to pressure gradients, and is capable of preventing failure due to settlement, compression, or uplift.

The existing filter containment vault provides for visual detection by plant personnel of failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours. The vault is designed to allow removal of liquids resulting from leaks, spills, or precipitation within 24 hours.

CONCLUSIONS OF ASSESSMENT

The design assessment performed and the information presented above and included in the Appendix of this report show that the replacement F-401c Waste Water Secondary Sand Filter at the Cytec Industries Fortier Plant in Westwego, Louisiana is adequately designed, will have sufficient structural strength, and will be sufficiently compatible with the waste being handled to not leak, collapse, rupture, or fail in its intended service. The design of the replacement system

CONCLUSIONS OF ASSESSMENT

component therefore satisfies the requirements of 40 CFR 264.192 and the corresponding State of Louisiana requirements in LAC 33:V.1905. The replacement filter will be located within an existing secondary containment structure which meets the secondary containment requirements of 40 CFR 264.193.f and LAC 33:V.1907.F.

APPENDIX

APPENDIX
DESIGN AND REVIEW DOCUMENTATION

Table of Contents

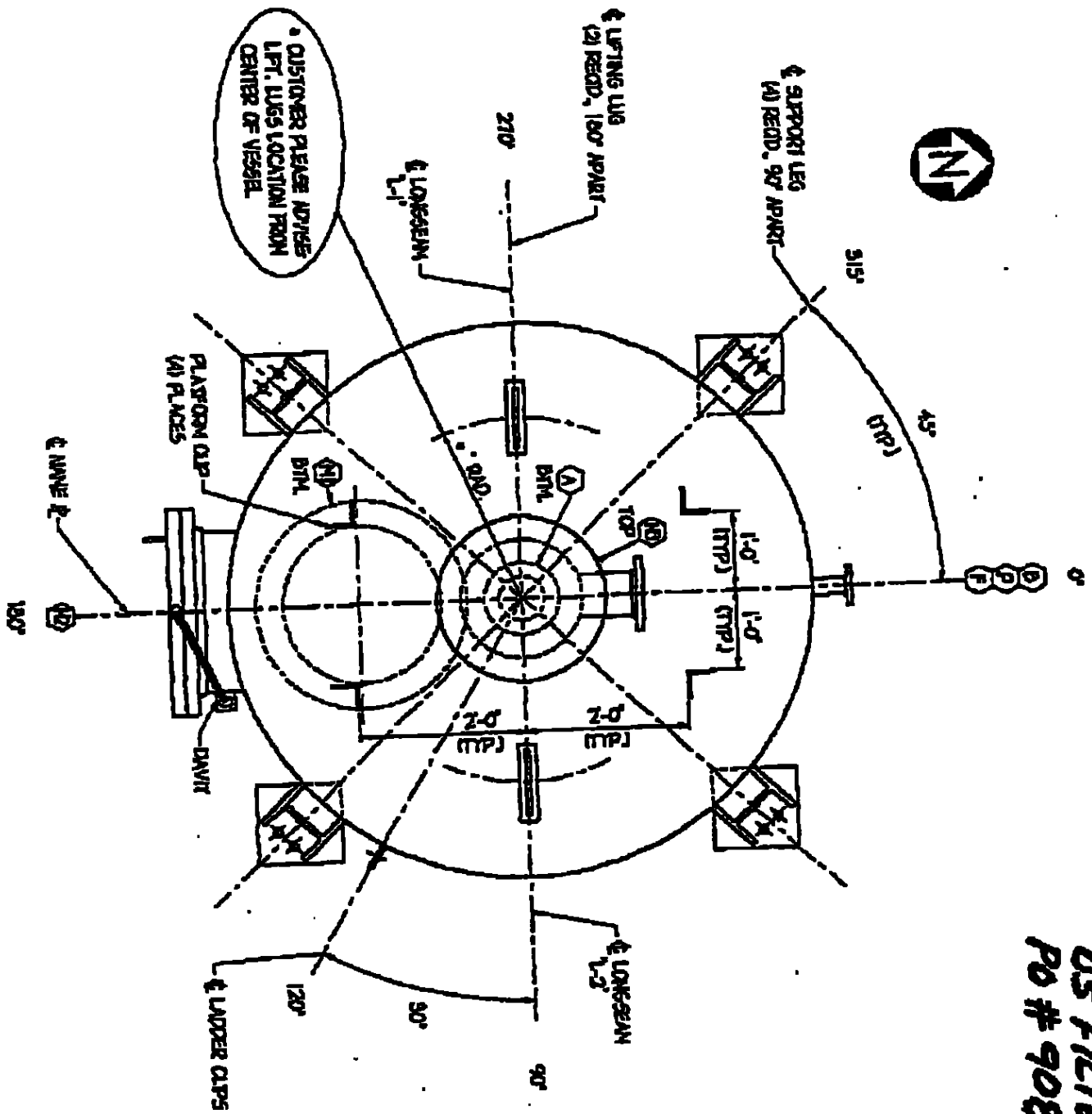
<u>Title</u>	<u>Page No.</u>
U.S. Filter P.O. # 90823-A Elevation Drawing	A- 1
U.S. Filter P.O. # 90823-A Plan Drawing	A- 2
TERA Pressure Vessel - Minimum Thickness Calculations (6/13/95)	A- 3
TERA Wind Load Check Calculations (6/13/95)	A- 5
TERA Vessel Nominal Volume Calculations (6/13/95)	A-10
Cytec MSDS Waste Water Column Bottoms (1/26/93)	A-11
Typical Cytec Injected Waste Analysis Data (4/7/95)	A-16

08/09/85

17:07

0310 8881980

U.S. FILTER WHIT

95-100-031-A
A-2

US FILTER
PO # 90823-A

TERA, Inc.

Client: Cytac Industries
Location: Westwego, LA
Item: F-401-C Replacement

Job No.: 95-100-031
Date: June 13, 1995
By: THW
Page 1 of 2

PRESSURE VESSEL - MINIMUM THICKNESS CALCULATIONS**INTERNAL PRESSURE**

Reference: ASME Boiler and Pressure Vessel Code, Section VIII, Division 1
Pressure Vessel Handbook, Megyesy, Eighth Edition

U.S. Filter Systems vessel data and calculations dated May 12, 1995

VESSEL DATA:

Design Pressure: $P_d := 100 \cdot \text{psi}$ (at top of vessel)
Design Temperature: 200 deg F (max.)
Contents S.G.: $SG := 1.066$ $P_{\text{water}} := 62.4 \cdot \frac{\text{lb}_f}{\text{ft}^3}$

Shell:

Inside Diameter: $D := 7 \cdot \text{ft} + 0 \cdot \text{in}$
Height/Length: $H_{\text{shell}} := 11 \cdot \text{ft} + 0 \cdot \text{in}$ (tan/tan)
Material: SA 240 Type 316 L
Allowable Stress: $S_s := 16700 \cdot \text{psi}$ (at max. temp.)
Nominal Thickness: $t_s := 0.375 \cdot \text{in}$
Seams:
Type: Butt welded
Radiograph: Spot
Efficiency: $E_s := 0.85$

Heads:

Type: 2:1 Ellipsoidal (Aspect Ratio: $AR := 2$)
Material: SA 240 Type 316 L
Allowable Stress: $S_h := 16700 \cdot \text{psi}$ (at max. temp.)
Nominal Thickness: $t_h := 0.3125 \cdot \text{in}$
Straight Flange: $H_f := 2 \cdot \text{in}$
Seams:
Type: Seamless
Radiograph: None
Efficiency: $E_h := 1.0$

TERA, Inc.

**Client: Cytac Industries
Location: Westwego, LA
Item: F-401-C Replacement**

**Job No.: 95-100-031
Date: June 13, 1995
By: THW
Page 2 of 2**

CALCULATIONS:

Tank Radius: $R := \frac{D}{2}$

Design pressure at bottom of vessel:

$$P := P_d + \left[H_{\text{shell}} + 2 \cdot \left(\frac{D}{AR} \right) \right] \cdot (SG \cdot \rho_{\text{water}})$$

$P = 106.7 \cdot \text{psi}$

Shell:

Thickness required for design pressure:

$$t_{\text{Sreq}} := \frac{P \cdot R}{S_s \cdot E_s - 0.6 \cdot P}$$

$t_{\text{Sreq}} = 0.317 \cdot \text{in}$

Heads:

Thickness required for design pressure:

$$t_{\text{Hreq}} = \frac{P \cdot D}{2 \cdot S_h \cdot E_h - 0.2 \cdot P}$$

$t_{\text{Hreq}} = 0.269 \cdot \text{in}$

TERA, Inc.

Client: Cytec Industries
Location: Westwego, LA
Item: F-401c Replacement

Job No.: 95-100-031
Date: June 13, 1995
By: THW
Page: 1 of 5

VERTICAL TANK WIND LOADS

Wind load analysis per:

American Society of Civil Engineers, ASCE Standard 7-88,
Minimum Design Loads in Buildings and Other Structures

Reference: *Pressure Vessel Handbook*, Megyesy, Eighth Edition
U.S. Filter Outline Drawing for P.O. # 90823-A

Tank Data:

Tank Diameter =	$D := 7\text{-ft} + 0\text{-in}$	
Height of Shell =	$H_s := 11\text{-ft} + 0\text{-in}$	(tan/tan)
Height of Heads =	$H_h := 21\text{-in}$	
Height of Support Legs =	$H_l := 2\text{-ft} + 4\text{-in}$	
Overturning Radius:	$R := 3\text{-ft} + 4\text{-in}$	(minimum across legs)
Nominal Shell thickness	$t_s := 0.375\text{-in}$	
Head Type:	2:1 Ellipsoidal	
Nominal Head thickness =	$t_h := 0.3125\text{-in}$	
Estimated appurtanance weight =	$W_s := 1000\text{-lbf}$	
Density of steel =	$\rho := 490 \frac{\text{lbf}}{\text{ft}^3}$	
Tank leg coefficient of friction =	$\mu := 0.25$	(estimated)

Estimated Tank Weight:

Shell: $W_s := \pi \cdot D \cdot H_s \cdot t_s \cdot \rho$
 $W_s = 3704 \cdot \text{lbf}$

Heads: $w_h := 806\text{-lbf}$ (ref. PVH: 5/16" thk. 84" dia. Ellip., each)
 $W_h := 2 \cdot w_h$
 $W_h = 1612 \cdot \text{lbf}$

Legs: $W_l := 4 \cdot (5\text{-ft}) \cdot \left(58 \cdot \frac{\text{lbf}}{\text{ft}}\right)$
 $W_l = 1160 \cdot \text{lbf}$

Client: Cytec Industries
 Location: Westwego, LA
 Item: F-401c Replacement

Job No.: 95-100-031
 Date: June 13, 1995
 By: THW
 Page: 2 of 5

Estimated Tank Weight: (continued)

Total Weight of Tank:

$$W_t = (W_s + W_h + W_l + W_a)$$

$$W_t = 7476 \cdot \text{lb}$$

Maximum Tank Height: $H = H_s + 2 \cdot H_h + H_l$
 $H = 16.83 \cdot \text{ft}$

WIND LOAD ON TANK

Wind Load Data:

Basic Wind Speed =	$V = 100 \cdot \text{mph}$	(Fig. 1)
Importance Factor =	$I = 0.95$	(Table 5)
Exposure Category =	C	(6.5.3.1)
Velocity Pressure Exposure Coefficient =	$K_z = 0.83$	(Table 6)
Gust Response Factor =	$G_h = 1.31$	(Table 8)
Force Coefficient (basic) =	$C_{fb} = 0.7$	(Table 12)
Force Coefficient (interpolated) =	$C_f = C_{fb} + \frac{\left(\frac{H}{D} - 1\right)}{6} \cdot 0.1$	
	$C_f = 0.72$	

Wind Load Calculations:

Velocity Pressure =	$q_z = 0.00256 \cdot K_z \cdot \left[1 + \left(\frac{V}{\text{mph}}\right)^2\right] \cdot \frac{\text{lb}}{\text{ft}^2}$	
	$q_z = 20.08 \cdot \frac{\text{lb}}{\text{ft}^2}$	
Normal Area =	$A_f = D \cdot (H_s + 2 \cdot H_h)$	(conservative)
Design Wind Force =	$F = q_z \cdot G_h \cdot C_f \cdot A_f$	
	$F = 1930 \cdot \text{lb}$	

Client: Cytac Industries
Location: Westwego, LA
Item: F-401c Replacement

Job No.: 95-100-031
Date: June 13, 1995
By: THW
Page: 3 of 5

SLIDING RESISTANCE

Coefficient of Friction required =

$$f := \frac{F}{W_t}$$

$$f = 0.26$$

Coefficient of Friction available =

$$\mu = 0.25$$

$$f = 0.26 > \mu = 0.25$$

Coefficient required greater than friction available

- therefore restraint provisions ARE required to resist the design wind sliding force.

TANK OVERTURNING

Tank overturning moment =

$$M_{wind} := F \cdot \left(\frac{H_s + 2 \cdot H_h}{2} + H_l \right)$$

$$M_{wind} = 18496 \cdot \text{lb} \cdot \text{ft}$$

Overturning resistance =

$$M_r := W_t \cdot R$$

(empty corroded tank)

$$M_r = 24920 \cdot \text{lb} \cdot \text{ft}$$

$$\frac{2}{3} \cdot M_r = 16614 \cdot \text{lb} \cdot \text{ft} \quad (\text{factor from ASCE 7-88})$$

$$M_{wind} = 18496 \cdot \text{lb} \cdot \text{ft} > \frac{2}{3} \cdot M_r = 16614 \cdot \text{lb} \cdot \text{ft}$$

Overturning moment is greater than 2/3 resistance moment

- therefore overturning resistance provisions ARE required in order to resist design wind overturning moment.

TERA, Inc.

Client: Cytac Industries
Location: Westwego, LA
Item: F-401c Replacement

Job No.: 95-100-031
Date: June 13, 1995
By: THW
Page: 4 of 5

TANK OVERTURNING (continued)

Restraining moment required from anchor bolts =

$$M_b := M_{wind} - \frac{2}{3} \cdot M_r \quad M_b = 1882 \cdot \text{lb} \cdot \text{ft}$$

Anchor Bolts provided: Eight 3/4" diameter

(for conservatism assume load carried by a single bolt corroded to 3/8" root diameter)

$$D_b := 0.375 \cdot \text{in}$$

Bolt restraining force required =

$$F_b := \frac{M_b}{2 \cdot R}$$

$$F_b = 282 \cdot \text{lb} \cdot \text{f}$$

Anchor bolt area =

$$A_b := \frac{\pi \cdot D_b^2}{4}$$

$$A_b = 0.1104 \cdot \text{in}^2$$

Anchor bolt stress =

$$T_b := \frac{F_b}{A_b}$$

$$T_b = 2556 \cdot \text{psi}$$

$$T_b = 2556 \cdot \text{psi} < 20000 \cdot \text{psi allowable tensile stress}$$

- therefore the anchor bolts furnished provide satisfactory additional restraint.

TANK SLIDING

Check anchor bolts' resistance to shear force due to tank sliding:
(For conservatism take no credit for bottom friction and assume load taken by four corroded bolts.)

Sliding Force =

$$F := q_z \cdot G_h \cdot C_f \cdot A_f$$

$$F = 1930 \cdot \text{lb} \cdot \text{f}$$

TERA, Inc.

Client: Cytac Industries
Location: Westwego, LA
Item: F-401c Replacement

Job No.: 95-100-031
Date: June 13, 1995
By: THW
Page: 5 of 5

TANK SLIDING (Continued)

Anchor bolt area in shear =

$$A_{\text{shear}} := 4 \cdot A_b$$

$$A_{\text{shear}} = 0.442 \cdot \text{in}^2$$

Shear stress in anchor bolts =

$$S_{\text{bolts}} := \frac{F}{A_{\text{shear}}}$$

$$S_{\text{bolts}} = 4369 \cdot \text{psi}$$

$$S_{\text{bolts}} = 4369 \cdot \text{psi} < 10,000 \text{ psi allowable shear stress} \quad \text{OK}$$

- therefore the anchor bolts furnished provide satisfactory restraint against sliding.

TERA, Inc.

Client: Cytec Industries
Location: Westwego, LA
Item: F-401-C Replacement

Job No.: 95-100-031
Date: June 13, 1995
By: THW
Page 1 of 1

VESSEL NOMINAL VOLUME CALCULATIONS

Reference: U.S. Filter Systems vessel data and calculations dated May 12, 1995
Pressure Vessel Handbook, Megyesy, Eighth Edition

VESSEL DATA:

Shell:

Inside Diameter: $D := 7\text{-ft} + 0\text{-in}$

Height/Length: $H_{\text{shell}} := 11\text{-ft} + 0\text{-in}$ (tan/tan)

CALCULATIONS:

Compare volume of old vessel (made with ASME flanged and dished heads; permitted capacity 3500 gallons) and replacement vessel (made with 2:1 ellipsoidal heads). All other pertinent vessel dimensions remain the same.

Volume:

Ellipsoidal Head: (ref. PVH) $V_{\text{ellip}} := 44.9\text{-ft}^3$ $V_{\text{ellip}} = 335.9\text{-gal}$

Vessel with Ellipsoidal Heads: $\text{Vol}_{\text{replmt}} := \frac{\pi}{4} \cdot D^2 \cdot H_{\text{shell}} + 2 \cdot V_{\text{ellip}}$

$\text{Vol}_{\text{replmt}} = 513.13\text{-ft}^3$ $\text{Vol}_{\text{replmt}} = 3838\text{-gal}$

Current Permitted Capacity: (from LDEQ permit Table 2)

$\text{Vol}_{\text{permit}} := 3500\text{-gal}$

Change in Capacity:

$\text{CapChange} := \text{Vol}_{\text{replmt}} - \text{Vol}_{\text{permit}}$

$\text{CapChange} = 338\text{-gal}$

Percent Change in Volume:

$\Delta := \frac{\text{Vol}_{\text{replmt}} - \text{Vol}_{\text{permit}}}{\text{Vol}_{\text{permit}}} \cdot 100$ $\Delta = 9.7\%$

CYTECA BUSINESS UNIT OF
AMERICAN CYANAMID COMPANY

MSDS No: 6086-05

DATE: 01/26/93

MATERIAL SAFETY DATA**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**PRODUCT NAME: **Waste Water Column Bottoms**

SYNONYMS: WWCB

CHEMICAL FAMILY: Mixture

MOLECULAR FORMULA: Mixture

MOLECULAR WGT: Mixture

AMERICAN CYANAMID COMPANY, FIVE GARRET MOUNTAIN PLAZA, WEST PATERSON, NEW JERSEY
07424, USA - 201/357-3100EMERGENCY PHONE: For emergency involving spill, leak, fire, exposure or accident call CHEMTREC:
1-800/424-9300.**2. COMPOSITION/INFORMATION ON INGREDIENTS**

OSHA REGULATED COMPONENTS

COMPONENT	CAS. NO.	%	TW/CEILING	REFERENCE
Acrylic acid	000079-10-7	0.9	10 ppm (skin) 2 ppm (skin) 1 ppm (skin)	OSHA ACGIH CYANAMID
Acrylamide	000079-06-1	0.1	0.03 mg/M3 (skin)	OSHA/ACGIH
Sulfuric Acid	007664-93-9	2.0	1 mg/M3	OSHA/ACGIH

3. HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW**

APPEARANCE AND ODOR: Light tan color; slightly sweet organic odor

STATEMENTS OF HAZARD:

CAUTION! MAY BE HAZARDOUS IF SWALLOWED, INHALED,
OR ABSORBED THROUGH SKIN
MAY CAUSE SKIN OR EYE IRRITATION

CHRONIC HAZARD WARNING:

CHRONIC TOXICITY HAZARD. CONTAINS ACRYLAMIDE
WHICH MAY CAUSE NERVOUS SYSTEM DAMAGE.
ACRYLAMIDE CAUSED CANCER AND MALE REPRODUCTIVE
DISORDERS IN LABORATORY ANIMAL TESTS.
Risk depends on duration and level of exposure.**POTENTIAL HEALTH EFFECTS**

EFFECTS OF OVEREXPOSURE:

The toxicological properties of this material have not been fully investigated.

Direct contact with this material may cause mild eye and skin irritation.

Refer to Section 11 for toxicology information on the OSHA regulated components of this product.

4. FIRST AID MEASURES

In case of skin contact, wash affected areas of skin with soap and water.

In case of eye contact, immediately irrigate with plenty of water for 15 minutes.

If vapor or dust of this material is inhaled, remove from exposure. Administer oxygen if there is difficulty in breathing.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: $\geq 200^{\circ}\text{F}$ ($\geq 93.3^{\circ}\text{C}$)

METHOD: Closed cup

FLAMMABLE LIMITS

(% BY VOL): Not Available

AUTOIGNITION TEMP: Not Available

DECOMPOSITION TEMP: Not Available

EXTINGUISHING MEDIA AND FIRE FIGHTING INSTRUCTIONS

Use water spray, carbon dioxide or dry chemical to extinguish fires. Use water to keep containers cool. Wear self-contained, positive pressure breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Where exposure level is not known, wear NIOSH approved, positive pressure, self-contained respirator. Where exposure level is known, wear NIOSH approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impervious boots. Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush area with water.

7. HANDLING AND STORAGE

Handle with caution. Do not get on skin, or breathe dust or vapor. Keep away from heat or flame. Wash after handling. Observe personal cleanliness.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

Engineering controls are not usually necessary if good hygiene practices are followed. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. Avoid unnecessary skin contact. Impervious gloves and apron are recommended to prevent skin contact. For operations where eye or face contact can occur, wear eye protection such as chemical splash-proof goggles or face shield. Where exposures are below the Permissible Exposure Limit (PEL), no respiratory protection is required. Where exposures exceed the PEL, use respirator approved by NIOSH for the material and level of exposure. See "GUIDE TO INDUSTRIAL RESPIRATORY PROTECTION" (NIOSH). Since this material contains a component with a skin notation with PEL as shown in the regulated components section, additional skin protection such as a protective suit or clothing may be required.

Shower after completion of workshift. Launder work clothing at end of workshift prior to reuse. Store street clothing separately from work clothing and protective equipment. Work clothing and shoes must not be taken home.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR: Light tan color; slightly sweet organic odor

BOILING POINT: Not Available

MELTING POINT: Not Available

VAPOR PRESSURE: Similar to water

SPECIFIC GRAVITY: 1.035 @ 100 F
VAPOR DENSITY: Similar to water
% VOLATILE (BY WT): Not Available
pH: 4-5
SATURATION IN AIR (BY VOL): Not Available
EVAPORATION RATE: Similar to water
SOLUBILITY IN WATER: Mostly solubility in water

10. STABILITY AND REACTIVITY

STABILITY: Stable
CONDITIONS TO AVOID: None known
POLYMERIZATION: Will Not Occur
CONDITIONS TO AVOID: None known
INCOMPATIBLE MATERIALS: Acids

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon monoxide, carbon dioxide, and/or oxides of nitrogen.

11. TOXICOLOGICAL INFORMATION

Toxicological information on the OSHA regulated components of this product is as follows:

Acrylic acid has an acute oral (rat) LD50, acute dermal (rabbit) LD50, and 4-hour inhalation (rat) LC50 values of 340-3200 mg/kg, 280 mg/kg, and 3.6 g/M3, respectively. Direct contact may cause severe eye and skin irritation. Inhalation overexposure may cause irritation of the respiratory tract and eyes. Prolonged or repeated exposure may cause allergic skin reactions.

The acute oral (rat) and acute dermal (rabbit) LD50 values for acrylamide (100%) are 295 mg/kg and 252 mg/kg, respectively. Neurotoxicity from acrylamide can result from a single ingestion but is more likely to occur after repeated ingestion of small amounts over a period of several days or weeks. Signs and symptoms of exposure include increased sweating of the hands and feet, numbness, tingling and weakness in the extremities, unsteady gait and decreased reflexes. Acrylamide is readily absorbed through unbroken skin. If the exposure route is dermal, the signs and symptoms described above may be preceded by peeling and redness of skin on the areas of exposure, normally the hands and feet. Eye contact with acrylamide may produce conjunctival irritation and may lead to systemic toxicity if contact is prolonged and/or repeated. Airborne acrylamide is readily absorbed through the lung and overexposure will produce signs and symptoms of neurotoxicity as described above. An initial two year study in rats where acrylamide was administered in the drinking water indicated that a variety of tumors could be produced at doses of 2 mg/kg/day. American Cyanamid Company conducted a lifetime study in which male Fischer rats received 0.1, 0.5, and 2 mg/kg/day and female Fischer rats received 1 and 3 mg/kg/day acrylamide in their drinking water. The only malignant tumor significantly increased in this second study was testicular mesothelioma, which is peculiar to rats. Non-malignant tumors of the thyroid were increased at doses above 0.5 mg/kg. Mammary tumors were statistically increased but were not above the historical average and thus of questionable toxicological significance. Other effects identified in the first study were not repeatable in the second study.

The acute oral (rat) LD50 and acute one-hour inhalation (rat) for sulfuric acid are 2,140 mg/kg and 347 ppm, respectively. Sulfuric acid is corrosive to the skin and eyes. Concentrated sulfuric acid can also be corrosive to the nose, mucous membranes, respiratory tract and gastrointestinal tract. Inhalation of the vapors or mist can cause pulmonary edema, emphysema or permanent changes in pulmonary function. Chronic exposure has been reported to be associated with dermatitis, chronic bronchitis, gastritis, erosion of dental enamel, conjunctivitis, increased frequency of respiratory tract infections and cancer of the larynx, lungs and upper respiratory tract. Sulfuric acid is reported to be a reproductive toxin in mammals.

12. ECOLOGICAL INFORMATION

The aquatic LC50, BOD, or COD information for this product's MSDS has not been established yet.

OCTANOL/H₂O PARTITION CCEP.: Not Available**13. DISPOSAL CONSIDERATIONS**

Disposal must be made in accordance with applicable governmental regulations.

14. TRANSPORT INFORMATION

SHIPPING NAME:	D.O.T. SHIPPING INFORMATION HAZARDOUS WASTE, LIQUID, N.O.S.	IMO SHIPPING INFORMATION NOT APPLICABLE/NOT REGULATED
HAZARD CLASS/ PACKING GROUP:	9 III	Not Applicable
UN NUMBER:	NA3082	Not Applicable
IMDG PAGE:	Not Applicable	Not Applicable
D.O.T. HAZARDOUS SUBSTANCES:	(PRODUCT REPORTABLE QUANTITY) K011 (10 lbs)	Not Applicable
TRANSPORT LABEL REQUIRED:	Miscellaneous	None Required
SHIPPING NAME:	ICAO/IATA NOT APPLICABLE/NOT REGULATED	TRANSPORT CANADA NOT APPLICABLE/NOT REGULATED
HAZARD CLASS:	Not Applicable	Not Applicable
SUBSIDIARY CLASS:	Not Applicable	Not Applicable
UN / ID NUMBER:	Not Applicable	Not Applicable
PACKING GROUP:	Not Applicable	Not Applicable
TRANSPORT LABEL REQUIRED:	None Required	None Required
PACKING INSTR:	PASSENGER Not Applicable CARGO Not Applicable	Not Applicable
MAX NET QTY:	PASSENGER Not Applicable CARGO Not Applicable	Not Applicable

ADDITIONAL TRANSPORT INFORMATION

TECHNICAL NAME (N.O.S.): (Contains K011 RCRA Waste)

15. REGULATORY INFORMATION

INVENTORY INFORMATION

US TSCA: This product is manufactured in compliance with all provisions of the Toxic Substances Control Act, 15 U.S.C.
This product contains a chemical substance that is subject to export notification under Section 12 (b) of the Toxic Substances Control Act, 15 U. S. C.

CANADA DSL: The Canadian Inventory information for this products MSDS has not been established yet.

EEC EINECS: The EEC Inventory information for this products MSDS has not been established yet.

OTHER ENVIRONMENTAL INFORMATION

The following components are defined as toxic chemicals subject to reporting requirements of Section 313 of Title III and of 40 CFR 372 or subject to other EPA regulations.

COMPONENT	CAS. NO.	%	TPQ(lbs)	RQ(lbs)	S313	RCRA	TSCA 12B
Acrylic acid	000079-10-7	0.9	NONE	5000	YES	U008	YES
Acrylamide	000079-06-1	0.1	1000	5000	YES	U007	NO
Sulfuric Acid	007664-93-9	2.0	1000	1000	YES	NONE	NO

PRODUCT CLASSIFICATION UNDER SECTION 311 OF SARA

ACUTE (N) CHRONIC (Y) FIRE (N) REACTIVE (N) PRESSURE (N)

16. OTHER INFORMATION

NFPA HAZARD RATING (National Fire Protection Association)

Fire 1 FIRE: Materials that must be preheated before ignition can occur.
Health 1 0 Reactivity HEALTH: Materials which on exposure would cause irritation but only minor residual injury even if no treatment is given.
— REACTIVITY: Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.
Special

REASON FOR ISSUE:

New Chronic Hazard Warning

Marvin A. Friedman, Ph.D., Director of Toxicology and Product Stewardship

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation and verification. Before using any product, read its label.

To: Vincent Diaz

Date: April 7, 1995

Location: Fortier

Copy to: F. Whiteley

From: Guy C A Rich

J. Schneller

Location: Fortier

A. Junker

J. Meyer

S. Eccei

P. Savoy

Subject: Injected Waste Analysis.

Reference: NB 1175, pp. 148-150 (G. Rich); DPWLAMD1.SEO Lines 372-381 (PC Rm 9);
DPWLMA1.SEO Lines 119-135 (PC Rm 9); MMEX9302.SEO Lines 516-527; NB 1167,
pp. 111-116 (J. Meyer); DW040695.S. DEEPWELL.S. NB 1174-110 (V. Diaz).

File Name: C:\6WINWORD\ENV\DW1Q95.DOC

Contributors: V. Diaz, J. Meyer.

SAMPLE HISTORY

Comprehensive knowledge of the character and composition of these materials is necessary for environmental and tax purposes prior to deep well injection.

SAMPLE DESCRIPTION

Analysis was performed on samples collected on . The composite Waste Acid sample was lost in a laboratory accident. Waste Acid analysis was performed on a single grab sample collected on 3/30/95.

1. Waste Acid Sample Individual Sample 3/30/95 84239625.
2. Waste Water Composite (composite of samples 84238995, 84239062, 84239148, and 84239190 collected on 3/20,21,22,23/95).
3. MET Composite (composite of samples 84238993, 84239060, 84239146, and 94239188 collected on 3/20,21,22,23/95).
4. NSB Composite (composite of samples 84238994, 84239061, 84239147, and 84239189 collected on 3/20,21,22,23/95).

RESULTS

	Waste Acid Individual	Waste Water Composite	MET Composite	NSB Composite
Acetone, ppm	340	<10	230	<10
Acrolein, ppm	-	79	<10	20
Acrylamide, ppm	-	1440	310	117
Acrylic Acid, ppm	-	7200	300	1540

	Waste Acid Individual	Waste Water Composite	VIET Composite	NSB Composite
Acrylonitrile, ppm	-	170	250	114
Acetonitrile, ppm	-	520	5000	7
Methanol, ppm	9300	10	250	<10
MMA, ppm	590	<10	120	<10
Toluene, ppm	-	0.011	2.87	0.010
Formic Acid, ppm	-	660	160	172
Acetic Acid, ppm	-	1030	1400	1390
Methacrylic acid, ppm	1600	-	-	-
Fumaronitrile, ppm	-	1450	9	37
Succinonitrile, ppm	-	67	1070	10,100
Benzene, ppm	-	<0.010	0.085	<0.010
MAL, ppm	1110	<25	<25	<10
Pyridine, ppm	-	330	<10	<10

TERA Report No. 95-100-066

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT
INSTALLATION ASSESSMENT
WASTE WATER SECONDARY FILTER F-401C**

For

**CYTEC INDUSTRIES
Westwego, Louisiana**



TERA, Inc.

3100 South Gessner Road • Suite 650 • Houston, Texas 77063
P.O. Box 770039 • Houston, Texas 77215-0039
Tel. (713) 783-6292 • Fax (713) 783-3698

95-100-066

HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT INSTALLATION CERTIFICATION

I have performed the assessment for the installation of a replacement for the F-401c Waste Water Secondary Filter at the Cytec Industries Fortier Plant in Westwego, Louisiana. The work performed is described and documented in the attached TERA, Inc. report No. 95-100-066 dated August 31, 1995. This assessment was performed to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 (b-f) and the corresponding requirements of LAC 33:V.1905 (B-F).

With regard to this duty, I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all related attachments and that, based on my observations and my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Thomas H. Wimbrow

Registered Professional Engineer

Louisiana No. 23062

TERA, Inc.

P. O. Box 770039

Houston, Texas 77215-0039

Signed: _____

Date: _____

Thomas H. Wimbrow

AUG 31, 1995



TERA, Inc.

3100 South Gessner Road • Suite 650 • Houston, Texas 77063
P.O. Box 770039 • Houston, Texas 77215-0039
Tel. (713) 783-6292 • Fax (713) 783-3698

August 31, 1995
95-100-066

Ms. Stacy Foret
CYTEC INDUSTRIES
10800 River Road
Westwego, Louisiana 70094

**Subject: Replacement Component Installation Assessment for
Waste Water Secondary Filter F-401c**

Dear Ms. Foret:

Submitted here is our installation assessment report for the installation of a replacement for Waste Water Secondary Filter F-401c. This work was performed at Cytec's Fortier Plant in Westwego, Louisiana.

The main report body summarizes assessment results in a format corresponding to the rules being addressed. Detailed information and documentation are presented in an Appendix.

We have enjoyed working with you on this interesting project, and look forward to another opportunity to be of service to Cytec. Please contact us at 713/783-6292 if you have any questions.

Very truly yours,

TERA, Inc.

Thomas H. Wimbrow, P.E.
Vice President and Chief Engineer

THW/da
Attachment: TERA Report No. 95-100-066

Aug 31, 1995

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT
INSTALLATION ASSESSMENT
WASTE WATER SECONDARY FILTER F-401C**

* * *

To

**CYTEC INDUSTRIES
Westwego, Louisiana**

* * *

By

**TERA, Inc.
Houston, Texas**

August 1995

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
DESCRIPTION OF REPLACEMENT	1
INSTALLATION ASSESSMENT	2
UNDERGROUND COMPONENTS	2
TIGHTNESS TESTING	3
ANCILLARY EQUIPMENT	3
CORROSION PROTECTION	3
CONCLUSIONS OF ASSESSMENT	4

APPENDIX - Inspection Documentation

HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT COMPONENT
INSTALLATION ASSESSMENT
WASTE WATER SECONDARY FILTER F-401c

This report documents the installation assessment performed for the installation of a replacement for Waste Water Secondary Filter F-401c at the CYTEC Industries Fortier Plant in Westwego, Louisiana. These assessments were performed and this report was prepared to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 (b-f) and the corresponding requirements of LAC 33:V.1905 (B-F).

DESCRIPTION OF REPLACEMENT

The replacement Waste Water Secondary Filter is a vertical pressure vessel 7 feet in diameter with straight sides 11 feet high and dished heads. It is constructed of welded stainless steel and has a nominal capacity of approximately 3800 gallons. It is supported by four structural steel legs on a reinforced concrete foundation. It is located inside a concrete secondary containment area. The new filter was installed as a replacement for a rubber lined carbon steel filter previously used for this service. No piping or other system ancillary equipment was replaced or modified as part of the filter replacement.

An assessment of the design of the replacement filter was performed previously by TERA and is documented in TERA, Inc. Report No. 95-100-031-A dated June 14, 1995. The scope of this report is limited to assessment of the installation and leak testing of the replacement filter.

INSTALLATION ASSESSMENT (40 CFR 268.192(b))

4 JMF 2-6-96

An installation assessment was performed by TERA to:

- a) verify correspondence between the system design documentation, applicable standards and the actual condition of the system, and
- b) detect installation damage, defective construction or other defects in the new system components.

Assessment methods used included visual inspection, ultrasonic thickness measurement, and hydrostatic leak testing of the replacement filter vessel following completion of installation. Documentation of the inspection and testing performed is included in the Appendix of this report.

Visual inspections were made of the exterior of the filter and the filter foundation. These inspections verified that the installation and arrangement of the replacement filter was consistent with the design documentation in the referenced design assessment.

With the exception of a leaking flange gasket which was replaced during the inspection, no defects in materials or fabrication; no evidence of installation damage; and no weld breaks, punctures, leaks, cracks, corrosion, or other deterioration were observed during the inspection and testing of the replacement filter installation.

UNDERGROUND COMPONENTS (40 CFR 268.192(c))

4 JMF 2-6-96

The Waste Water Secondary Filter system does not include any underground components.

TIGHTNESS TESTING (40 CFR 268.192(d))
4 JMF 2-6-96

The replacement filter was tested for tightness prior to being placed in service. Tightness testing included both hydrostatic testing of the replacement filter in accordance with ASME Code requirements (performed at the fabricator's plant) and final leak testing of the filter and its connections following installation at Cytec's facility. The ASME stamp on the filter nameplate confirms that the vessel successfully passed the Code test at 1.5 times the vessel design pressure. TERA personnel witnessed the on-site leak testing performed. A leaking flange gasket was replaced during the leak test and there was no evidence of leakage from the filter or its connections during final leak testing. Documentation of the leak testing performed is included in the Appendix.

ANCILLARY EQUIPMENT (40 CFR 268.192(e))
4 JMF 2-6-96

No filter system piping or other ancillary equipment items were replaced or modified as part of the filter vessel replacement. The tightness of the replacement filter connections to the existing system ancillary equipment components was verified by the leak testing performed.

CORROSION PROTECTION (40 CFR 268.192(f))
4 JMF 2-6-96

The replacement filter is constructed of stainless steel. Past experience with the waste has shown that the waste being handled is compatible with and not corrosive to stainless steel. The replacement filter will not be in contact with soil or groundwater. Therefore, cathodic protection or other additional corrosion protection is not required.

CONCLUSIONS OF ASSESSMENT

The assessments and inspections performed and the information presented above and included in the Appendix of this report confirm that the replacement F-401c Waste Water Secondary Filter at the CYTEC Industries Fortier Plant in Westwego, Louisiana has been installed in accordance with the system design documentation and applicable specifications. Inspections and testing for inadequate construction, damage, and tightness revealed no unrepaired leaks or significant defects in the replacement filter or its connections to existing waste system components. The installation therefore satisfies the requirements of 40 CFR 264.192(b-f), and the corresponding requirements of LAC 33:V.1905(B-F).

APPENDIX
Inspection Documentation

APPENDIX
Inspection Documentation

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
TERA New Tank Inspection Record (8/23/95)	A-1
TERA Thickness Measurement Record (8/23/95)	A-2
TERA Leak Test Record (8/23/95)	A-3

NEW TANK INSPECTION RECORD

CLIENT: Cytec Industries
 PLANT LOCATION: Westwego, Louisiana
 TYPE INSPECTION: External
 ITEM NO.: F-401c CODE: ASME Code
 SERVICE: Replacement Waste Water Secondary Filter

Sheet: 1 of 1
 Job No.: 95-100-066
 Date: 8/23/95
 By: THW
 Year Built: 1995

CAPACITY: approx. 3,800 gallons TANK/DRUM TYPE: Vertical w/elliptical heads

	<u>ROOF/TOP HD.</u>	<u>WALL/SHELL</u>	<u>FLOOR/BOT.HD.</u>	<u>JACKET</u>
MATLS:	Stainless Steel	Stainless Steel	Stainless Steel	None

SHELL CONDITION:	Satisfactory
ROOF CONDITION:	Satisfactory
BOTTOM CONDITION:	Satisfactory
JACKET CONDITION:	None
SUPPORT TYPE:	Structural steel legs
FOUNDATION CONDITION:	Satisfactory
INTERNAL STRUCTURE CONDITION:	Not visible
WELDED/FLANGED JOINT CONDITION:	Welded joints satisfactory
NOZZLE CONDITION:	Satisfactory
LINING/COATING CONDITION:	None
INSULATION CONDITION:	None
SIGNS OF CRACKS:	None
SIGNS OF PUNCTURES:	None
SIGNS OF COATING DAMAGE:	None
SIGNS OF CRACKS/MATERIAL DAMAGE:	None
SIGNS OF CORROSION:	None

SIGNS OF OTHER STRUCTURAL DAMAGE OR PROBLEMS: None

TEST? Yes TYPE: Hydrostatic Leak RESULTS: Satisfactory

OPERATING CONDITIONS: MAX TEMP: 200° F MAX PRESS: 100 psi VAC: No

REFERENCE INSPECTION RECORDS: Thickness Measurement Record 8/23/95

Leak Test Record 8/23/95

COMMENTS: Vessel appears visually satisfactory and per design drawings. Nameplate information and ASME stamp per design. No evidence of leaks or problems.

TERA, INC.

A-2

THICKNESS MEASUREMENT RECORD

Client: Cytec Industries
Plant Location: Westwego, LA

Sheet: 1 of 1
Job No.: 95-100-066
Date: 8/23/95
By: THW

Tank Number: Replacement F-401c Waste Water Secondary Filter

SHELL AND HEADS				
LOCATION	POSITION			
	North	East	South	West
Bottom Head - Center	0.553			
Bottom Head - Knuckle	0.558			
Bottom Head - St. Flange	0.570			
Shell course 1 - Low	0.394			
Shell Course 1 - Mid	0.394			
Shell Course 1 - High	0.395			
Shell Course 2 - Low	0.391			
Shell Course 2 - Mid			0.399	
Shell Course 2 - High			0.396	
Top Head - St. Flange			0.545	
Top Head - Knuckle			0.540	
Top Head - Center			0.553	

Comments: Measurements taken with a Stresstel Model T-2000 digital thickness gage calibrated with a 0.250 in. steel block. 2" nozzle side of vessel called "North", Ladder called "South". Vessel constructed of stainless steel.

TERA, INC.
LEAK TEST RECORD

A-3

CLIENT:	CYTEC Industries	SHEET:	1 of 1
PLANT LOCATION:	Westwego, Louisiana	JOB NO.:	95-100-066
COMMENTS:		DATE:	8/23/95
		BY:	THW

=====

ITEM TESTED: Replacement Waste Water Secondary Filter F-401c

NORMAL OPERATING PRESSURE: 100 psi max.

RELIEF PRESSURE: 100 psi DESIGN PRESSURE: 117 psig

TEST TYPE: Hydrostatic Leak Test

TEST PRESSURE: 60 psi TEST DURATION: 15 + min.

TEST RESULTS: Satisfactory CHART NO.: None

WITNESSED BY: THW DATE: 8/23/95

COMMENTS: Filter vessel leak tested using plant "coag" water. Leaking gasket on flange of filter bottom inlet was replaced and vessel retested. All vessel joints, seams, and connections examined with no evidence of leakage or of vessel or foundation distress. Test accepted as satisfactory.



TERA, Inc.

3100 South Gessner Road • Suite 650 • Houston, Texas 77063
P.O. Box 770039 • Houston, Texas 77215-0039
Tel. (713) 783-6292 • Fax (713) 783-3698

96-100-073

HAZARDOUS WASTE TANK SYSTEM **COMPONENT REPLACEMENT DESIGN ASSESSMENT** **CERTIFICATION**

I have performed a design assessment for the replacement of WWCB Well Injection Tank TA-402 at the CYTEC Industries Fortier Plant. The work performed is described and documented in attached TERA, Inc. Report No. 96-100-073 dated November 8, 1996. This assessment was performed to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 and 40 CFR 264.193, and the corresponding requirements of LAC 33:V.1905 and LAC 33:V.1907.

With regard to this duty, I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all related attachments and that, based on my observations and my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Thomas H. Wimbrow

Registered Professional Engineer

Louisiana No. 23062

TERA, Inc.

P. O. Box 770039

Houston, Texas 77215-0039

Signed: _____

Date: _____

Thomas H. Wimbrow
Nov 8, 1996



TERA, Inc.

3100 South Gessner Road • Suite 650 • Houston, Texas 77063
P.O. Box 770039 • Houston, Texas 77215-0039
Tel. (713) 783-6292 • Fax (713) 783-3698

November 8, 1996
96-100-073

Ms. Stacy Foret
CYTEC INDUSTRIES, INC.
10800 River Road
Westwego, Louisiana 70094

Subject: Design Assessment for Replacement of WWCB Well Injection Tank TA-402

Dear Ms. Foret:

Submitted here is our design assessment report for the replacement of the existing rubber lined carbon steel WWCB Well Injection Tank (TA-402) at Cytec's Fortier Plant with an improved tank of the same capacity constructed of stainless steel. The main report body summarizes assessment results in a format corresponding to the rules being addressed. Detailed information and documentation are presented in the report Appendix.

We believe the tank replacement classifies as a Class 1 hazardous waste permit modification under the provisions of LAC 33:V.322.G.3 since it complies with all of the following criteria:

1. The replacement tank meets the same design standards as the original (API 650);
2. the replacement tank has a capacity within + or - 10 percent of that of the replaced tank (no change in capacity);
3. the capacity difference is not more than 1500 gallons (no change in capacity);
4. the facility's permitted tank capacity is not increased (no change in capacity); and
5. the replacement tank meets the same conditions specified in the permit (no change in tank design conditions).

We have enjoyed working with you on this interesting project, and look forward to another opportunity to be of service to Cytec. Please contact us at 713/783-6292 if you have any questions.

Very truly yours,

TERA, Inc.

Thomas H. Wimbrow, P.E.
President and Chief Engineer

THW/da
Attachment: TERA Report No. 96-100-073

Nov 8, 1996

**HAZARDOUS WASTE TANK SYSTEM
COMPONENT REPLACEMENT DESIGN ASSESSMENT
WWCB WELL INJECTION TANK (TA-402)**

* * *

To

**CYTEC INDUSTRIES
Waggaman, Louisiana**

* * *

By

**TERA, Inc.
Houston, Texas**

November 1996

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
DESCRIPTION OF COMPONENT REPLACEMENT	1
DESIGN ASSESSMENT	3
Design Standards	3
Hazardous Characteristics of the Waste	4
Corrosion Protection Measures	4
Equipment Support and Protection	5
Foundation Design	5
Ancillary Equipment	6
Pressure Containment and Overfill Provisions	6
SECONDARY CONTAINMENT ASSESSMENT	6
CONCLUSIONS OF ASSESSMENTS	8

APPENDIX - Assessment Documentation

HAZARDOUS WASTE TANK SYSTEM
COMPONENT REPLACEMENT DESIGN ASSESSMENT

This report documents a design assessment which was performed for the proposed replacement of the existing rubber lined carbon steel Wastewater Column Bottoms (WWCB) Well Injection Tank (TA-402) at Cytec Industries' Fortier Plant with an improved tank of the same capacity constructed of stainless steel. These assessments were performed and this report was prepared to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 and 40 CFR 264.193, and the corresponding State of Louisiana requirements in LAC 33:V.1905 and LAC 33:V.1907.

DESCRIPTION OF COMPONENT REPLACEMENT

The proposed waste system component replacement consists of the replacement of the existing WWCB Well Injection Tank, which is constructed of carbon steel with a rubber internal lining, with a new tank constructed of stainless steel. The tank material of construction is being upgraded to stainless steel in order to provide improved resistance to corrosion and thus increase the protection of human health and the environment. The replacement tank will be the same size and have the same capacity (approximately 10,000 gallons) as the existing tank. The replacement tank has been designed and will be fabricated to meet the same design operating conditions and design and construction standard (API 650) as the original tank.

The design of the replacement tank includes several other improvements which are also intended to increase the protection of human health and the environment while meeting the above conditions. The other improvements or modifications which will be incorporated in the replacement tank are:

DESCRIPTION OF COMPONENT REPLACEMENT (Continued)

1. One 16 inch nozzle will be added to the tank roof and one 3 inch nozzle will be added to the tank shell. The addition of these two nozzles to the existing rubber lined carbon steel tank was described in TERA Report No. 96-100-032 and approved by the LDEQ by letter dated July 9, 1996. (A copy of the LDEQ approval letter is included in the Appendix of this report for reference.) The 16 inch nozzle will be used for the installation of an auxiliary pressure relief and vacuum relief device. This additional venting capability is being added to ensure that the tank has adequate venting capacity under emergency fire exposure and normal vent failure conditions.
2. An additional 3 inch roof nozzle is being added to the replacement tank to provide a tank inlet for the discharge of the Wastewater Sock Filter (CF-401) backwash line relief valve. Modification of the backwash system for the Wastewater Sock Filters, as described in TERA Report No. 94-100-054-03 and approved by the LDEQ by letter dated March 6, 1995 (see Appendix), required installation of a relief valve to protect the filters against overpressure. The new tank nozzle will provide for the installation of piping which will contain any waste released by the relief valve and direct it safely to the tank. The less desirable alternative would be to allow the relief valve to discharge directly into the secondary containment vault. The tank inlet has been designed to minimize turbulence on the tank surface in order to reduce or eliminate volatilization of organics in anticipation of implementation of RCRA Part 264/265 Subpart CC.
3. The design of the vent scrubber support provisions on the replacement tank will be improved to provide additional support for the base of the scrubber.

DESCRIPTION OF COMPONENT REPLACEMENT (Continued)

4. The tank bottom leak detection method for the replacement tank will also be upgraded to a false or double bottom design which includes a nitrogen purge of the space between the bottoms. This method of leak detection is superior to the method used for the existing tank (a gravel bed under the tank which drains to a leak detection catch pot). The old method required sampling to determine if accumulated liquid in the catch pot was tank leakage or condensate from the tank floor or accumulations from an external source such as rainwater. The tank foundation and anchorage design have also been modified to accommodate the improved tank bottom leak detection system.

5. Three coupling-type nozzles located on the roof of the existing tank were deleted from the replacement tank design since there is no longer any need for them.

DESIGN ASSESSMENT

Design Standards

An assessment was made of the design of the proposed replacement tank. This assessment indicated that the standards listed below are appropriate for this application:

1. API 650, *Welded Steel Tanks for Oil Service*
2. ASCE 7-88, *Design Loads for Buildings and Other Structures*

The review performed confirmed that the replacement tank is designed in accordance with the requirements of API 650 and ASCE 7-88 and will be appropriate for the service conditions.

DESIGN ASSESSMENT (Continued)

Hazardous Characteristics of the Waste

The wastes which will be handled by the replacement tank are waste water streams resulting from on-site chemical manufacturing processes. They consist of water contaminated with relatively small amounts of various chemicals. The primary hazardous characteristic of the wastes is toxicity. Additional waste characterization data provided by Cytec is included in the Appendix of this report.

Corrosion Protection Measures

The replacement tank will be located aboveground and will not be in contact with soil or groundwater. Therefore, corrosion-resistant materials of construction, a corrosion-resistant coating with cathodic protection, or electrical isolation devices are not required. The replacement tank will be, however, constructed of corrosion-resistant material (stainless steel).

All portions of the replacement tank will be constructed of type 304 or better stainless steel. Past experience at this facility has confirmed that the waste material is compatible with and not corrosive to the stainless steel material of construction specified. The exterior of the replacement tank will also be protected from atmospheric corrosion by the stainless steel material of construction.

Review of the corrosion protection measures and materials of construction indicates that they will provide satisfactory protection from corrosion and adequate service life under the intended service conditions.

DESIGN ASSESSMENT (Continued)

Equipment Support and Protection

The replacement tank will be supported by a reinforced concrete foundation. Protection from damage and vehicular traffic is provided by the tank being located inside a reinforced concrete secondary containment vault and thus away from vehicular traffic areas. Review of the tank support provisions indicates that they will provide adequate protection from physical damage and excessive stress resulting from settlement, vibration, expansion or contraction.

Foundation Design

The replacement tank will be supported by the existing tank's reinforced concrete foundation which will be modified slightly to accommodate some of the replacement tank's design features. The foundation modifications will include filling the tank bottom leak detection well in the center of the foundation with reinforced concrete to provide improved support for the new tank's double bottom, and installation of new anchor bolts to fit the new tank's anchor locations. The long-term satisfactory performance of the existing tank foundation demonstrates that the foundation will be satisfactory for the replacement tank as well, since there will be no significant change in the loads imposed by the tank.

The replacement tank will not be located in a saturated zone, so special anchorage to resist flotation or dislodgement is not required (although tank anchorage is provided). Calculations in the Appendix confirm that the replacement tank anchorage provisions are satisfactory for the design wind load conditions specified in ASCE 7-88. The replacement tank will be located in a zone of low seismic activity (Zone 0 from ASCE 7-88) so special earthquake anchorage provisions

DESIGN ASSESSMENT (Continued)

Foundation Design (Continued)

are not required. The new tank will also not be subject to excessive stress or damage due to frost heave.

Ancillary Equipment

The tank replacement does not include or require the modification or replacement of any of the tank ancillary equipment items except as described previously and approved by LDEQ.

Pressure Containment and Overfill Provisions

The pressure containment capacity of the replacement tank has not been reduced or significantly altered from that of the existing tank. The replacement tank pressure and vacuum design conditions are at least equal to those of the original tank and meet or exceed the requirements of the intended service. The replacement tank will be protected from possible damage due to over- or under-pressure by the new and existing pressure and vacuum relief devices. The existing tank overfill prevention measures (which include level monitoring, a high level alarm, and block valves to stop the flow of liquid into the tank) will be used for the replacement tank.

SECONDARY CONTAINMENT ASSESSMENT

The replacement tank will be located inside the same reinforced concrete containment vault which provided secondary containment for the existing tank. The replacement tank will be located aboveground and will be accessible for daily visual

SECONDARY CONTAINMENT ASSESSMENT (Continued)

inspection for the detection of leakage. The tank bottom will be provided with leak detection by the new double bottom design.

The existing containment vault has been designed and installed and is operated so as to prevent migration of wastes or accumulated liquid out of the system to the soil, ground water, or surface water at any time. The existing containment vault is capable of collecting releases and accumulated liquids for visual detection and capable of holding them until the collected material is removed.

The existing containment vault is constructed of a material (reinforced concrete) that is compatible with the wastes being stored. The satisfactory long-term performance of the existing vault demonstrates that it has sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste, climatic conditions, and the stress of daily operation. The satisfactory performance of the existing vault also demonstrates that the vault base is capable of providing support to the secondary containment system and resistance to pressure gradients, and is capable of preventing failure due to settlement, compression, or uplift.

The existing secondary containment system provides for visual detection by plant personnel of failure of either the primary or secondary containment structures or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours. The existing containment vault is sloped to a sump which is designed to allow removal of liquids from resulting leaks, spills, or precipitation within 24 hours.

CONCLUSIONS OF ASSESSMENTS

Based on the reviews and assessments performed and the information presented above and included in the Appendix to this report, the proposed replacement WWCB Well Injection Tank TA-402 at the CYTEC Industries Fortier Plant, is adequately designed, will have sufficient structural strength and support, and will be sufficiently compatible with the waste to be handled to not leak, collapse, rupture, or fail if operated in its designed condition and service. An existing containment vault will provide the replacement tank with secondary containment provisions meeting the requirements of 40 CFR 264.193 and LAC 33:V.1907.

APPENDIX
Assessment Documentation

APPENDIX
Assessment Documentation

TABLE OF CONTENTS

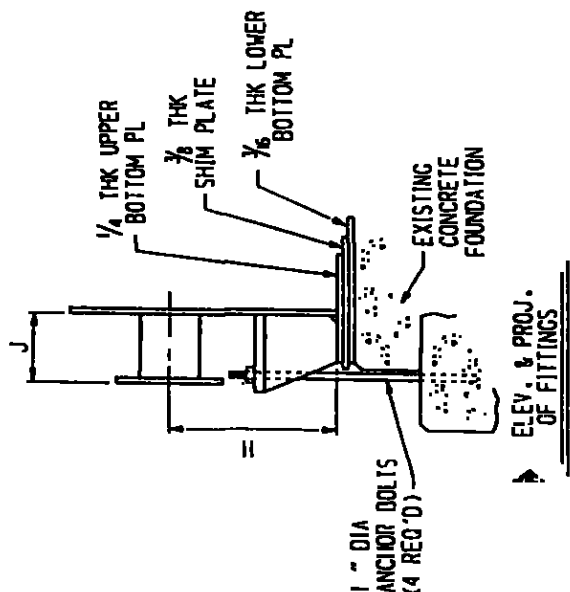
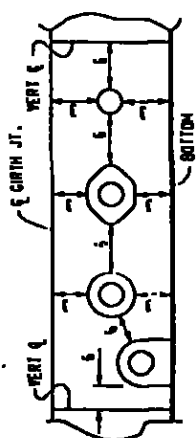
<u>Title</u>	<u>Page No.</u>
CBI General Arrangement Drawing No. 1 Rev. 3	A-1
CBI Orientation Drawing No. 2 Rev. 1	A-2
CBI Bottom Assembly Drawing No. 3 Rev. 0	A-3
CBI Leak Detection Cplg. Drawing No. 17 Rev. 0	A-4
CBI Vent Scrubber Support Drawing No. 18 Rev. 1	A-5
CBI 3 Dia. Roof Nozzle Drawing No. 22 Rev. 0	A-6
CBI Anchor Bolt Setting Plan Drawing No. F1 Rev. 0	A-7
LDEQ Letter dated July 9, 1996	A-8
LDEQ Letter dated March 6, 1995	A-9
CBI Tank Calculations with TOC dated 11/1/96	A-11
Cytec Injected Waste Analysis Memo and Results Dated January 10, 1996	A-25

APPURTENANCES FURNISHED & INSTALLED BY GRI					
QIST MARK	NO. REQ'D	QSI MARK	QSI QUANTITY	ELEVATION H	DESCRIPTION
A	1	9-A	9	---	0'-6" 4 DIA #150 RF50 R205 NOZ VENT SCRUBBER WATER OUTLET
B	1	10-A	10	---	0'-6" 3 DIA #150 RF50 R205 NOZZLE (SPARE)
C	1	10-A	10	---	0'-6" 3 DIA #150 RF50 R205 NOZZLE LEVEL TRANSMITTER
D	1	11-A	11	---	0'-6" 2 DIA #150 RF50 R205 NOZZLE (SPARE)
E	1	12-A	12	0'-5	0'-7" 3 DIA #150 RF50 R205 NOZZLE (SPARE)
F	1	12-B	12	0'-5	0'-7" 4 DIA #150 RF50 R205 NOZZLE (GRAIN)
G	1	12-A	12	0'-5	0'-7" 3 DIA #150 RF50 R205 NOZZLE (EMERGENCY WATER INLET)
H	1	12-A	12	0'-5	0'-7" 3 DIA #150 RF50 R205 NOZZLE (OUTLET)
J	1	14-A	14	---	0'-10" 16 DIA #150 RF50 R205 NOZZLE (EMERGENCY VENT)
L	1	21-1	21	---	---
M	1	22-1	22	---	0'-7" 6 DIA #150 RF50 R205 NOZZLE (VENT SCRUBBER INLET)
MHI	1	15-A	15	2'-0 3/4	0'-6" 3 DIA #150 RF50 R205 NOZZLE (FILTER PSY DISCHARGE)
					24 DIA API 650 SCEL MANHOLE

FOUNDATION — EXISTING CONCRETE SLAB
CONSTRUCTION — BY CBI MACON
SERVICE — WCB INJECTION (S.G. = 1.0)
CAPACITY — 9986 GALLONS (NOMINAL)
SPECIFICATIONS— API 650 APP. 5 (NON-CERTIFIED DUE TO EXISTING SHELL)
DESIGN METAL TEMPERATURE — 39°F
DESIGN WIND VELOCITY — 113 MPH PER API 650
ROOF LOAD — 25.0 PSF
SEISMIC — NONE
MATERIAL SPEC. — PLATES — A240 304L (ROOF & BOTTOM)

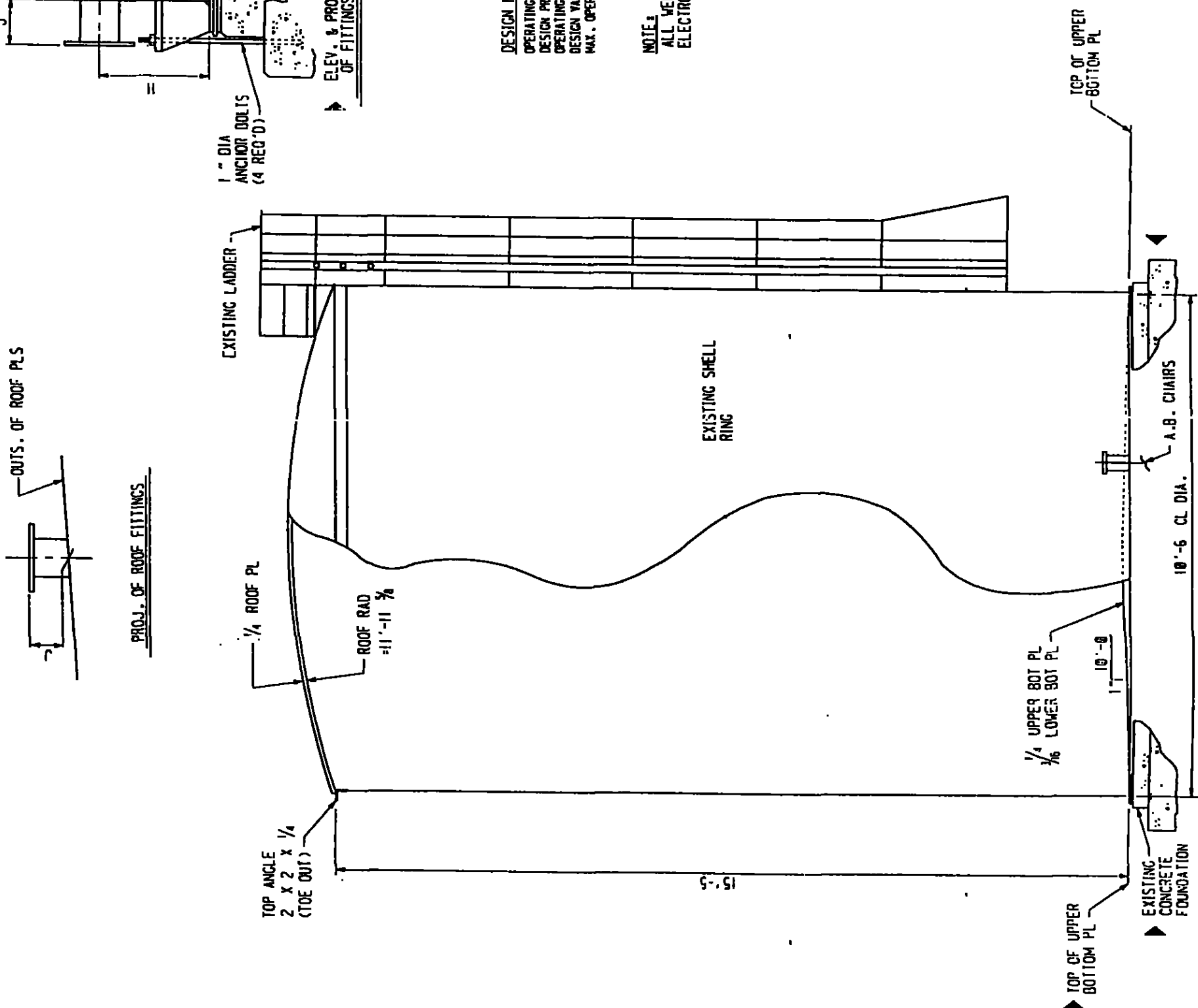
CORROSION ALLOWANCE—NONE
INSPECTION - MILL - CTR
SHOP - CBI
FIELD - CBI & CUSTOMER
SURFACE
PREPARATION—NONE
PAINTING—NONE
WELD EXAM.—PER API 650, ART 653

TESTING -- TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S). IF FITTING LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH ABOVE. DIMENSIONS GIVEN ARE TOE-TO-TOE OF FILLER WELDS ON TOE-TO-CL OF BUTT WELDS. FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SKEW NOZZLES. FLANGE BOLT HOLES TO STRADDLE 0° - 180° CENTERLINE FOR ROOF NOZZLES. DURING WATER TEST DO NOT FILL TANK ABOVE MAXIMUM HEIGHT OF 15'-7" OVER FILLING MAY CAUSE DAMAGE.



DESIGN NOTES

NOTE:
ALL WELDING TO BE DONE WITH E308L
ELECTRODE UNLESS NOTED OTHERWISE.

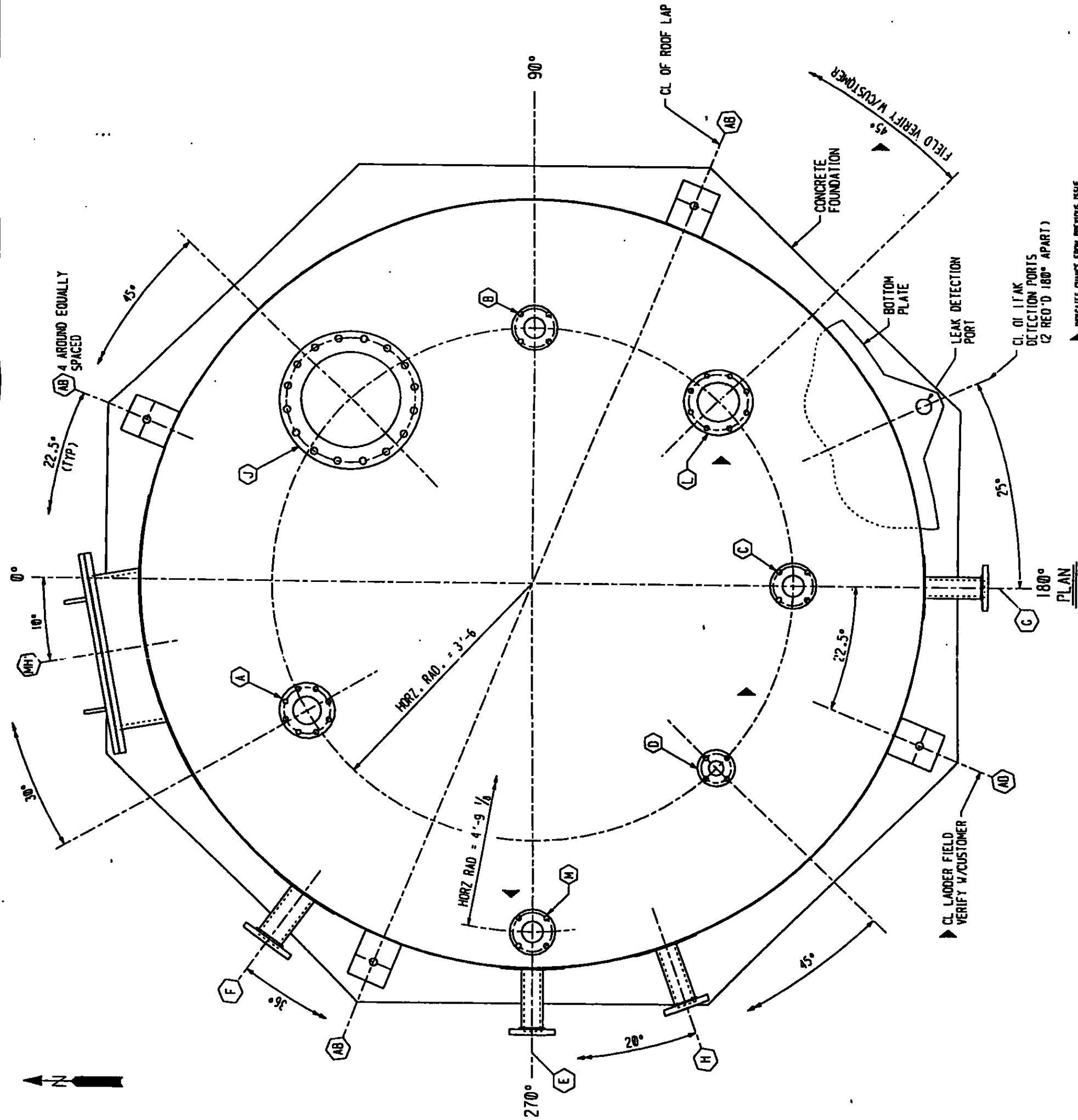


GENERAL ELEVATION

DEDICATED COVER FROM PREVIOUS ISSUE

CUSTOMER'S NO. 9622081		CONTRACT NO. 9622081	
BY DHC CM3 DATE 10-19-96 HOUSTON, TEXAS (FACILITY AS ASSIGNED)		DHC 1 SMT	
GENERAL ARANGEMENT 10'-5 3/4" X 15'-5 HIGH O.R.I. TANK TA-402 COPEC INDUSTRIES, INC. WESTWEGO, L.A.			
CUSTOMER'S NO. BY DHC CM3 DATE 10-19-96 HOUSTON, TEXAS (FACILITY AS ASSIGNED)			
DHC 1 SMT			
GENERAL ARANGEMENT 10'-5 3/4" X 15'-5 HIGH O.R.I. TANK TA-402 COPEC INDUSTRIES, INC. WESTWEGO, L.A.			

96-100-073 A-2			TABLE OF ARCS AND CHORDS	
ANGLE	ARCS	CHORDS		
1°	.0919 FT.			
10°	0'-11			
20°	1'-10 1/16			
25°	2'-3 3/16			
30°	2'-9 1/12			
35°	3'-3 23/32			
45°	4'-1 1/8			



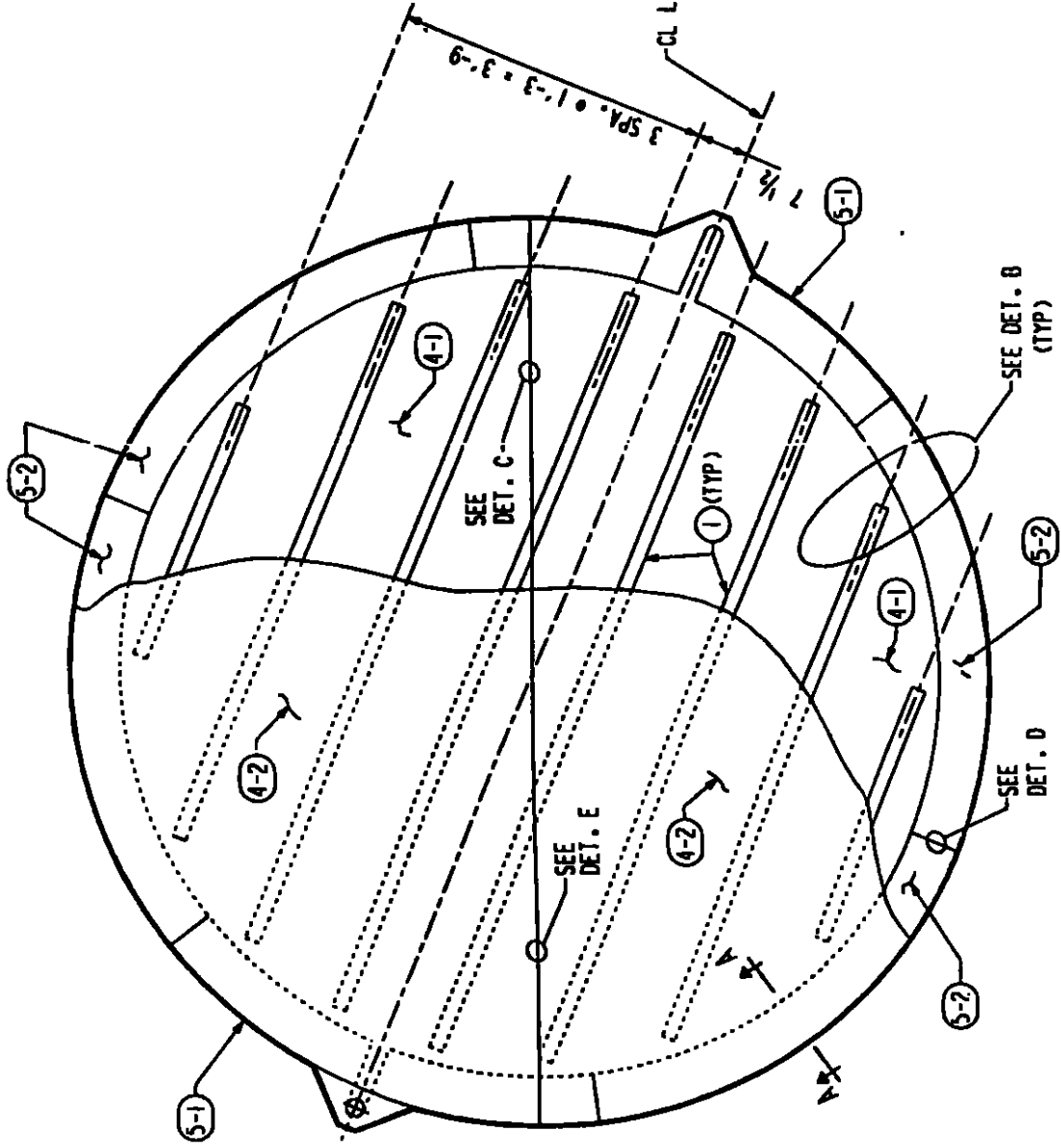
NOTES
1. ALL ARC'S ARE ON OUTSIDE OF FIRST SHELL RING. (RAD = 5'-3 3/16)

○ - CBI MARK
⬡ - CUSTOMER MARK

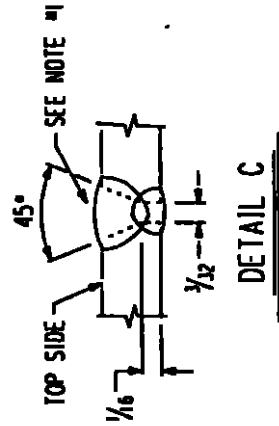
CBI		ORIENTATION	
10'-6 DIA X 15'-5 HIGH D.R.I.		TANK TA-402	
CYTEC INDUSTRIES, INC.		WESTMECO, L.A.	
CUSTOMER'S NO	962031	DATE	10-24-95
BY	CMC	DESIGNED BY	HOUSTON, J. METERS
REVISIONS	1	ENGINEERING ASSIGNED	1
DATE	10-24-95	REVISIONS	2
DATE	10-24-95	REVISIONS	3
DATE	10-24-95	REVISIONS	4
DATE	10-24-95	REVISIONS	5
DATE	10-24-95	REVISIONS	6
DATE	10-24-95	REVISIONS	7
DATE	10-24-95	REVISIONS	8
DATE	10-24-95	REVISIONS	9
DATE	10-24-95	REVISIONS	10

QTY	MARK	DESCRIPTION	LEVEL	SYTC	ID
1	3-A	10110M ASSM MIN Y			
1	3-1	BAR 1 X 3/8	60	A276-304L	C
2	4-1	PL SK X 3/16		A248-304L	B
		(72 X 20'-7 1/2 C2)			
2	4-2	PL SK X 1/4		A248-304L	B
		(72 X 20'-7 1/2 C2)			
2	5-1	PL SK X 3/8		A248-304L	B
		(72 X 6'-8 C2)			
4	5-2	PL SK X 3/8		A248-304L	B
		(CM 5-1)			

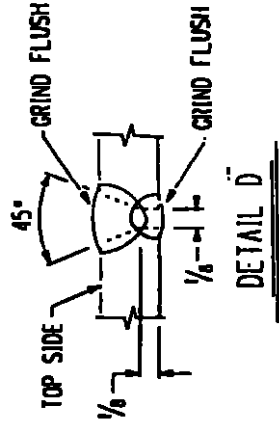
96-100-073
A-3



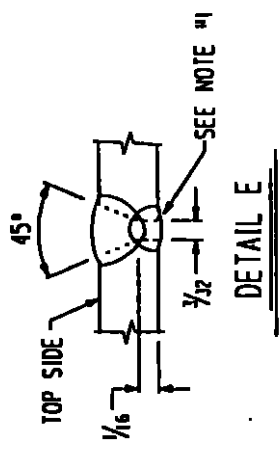
PLAN (A)



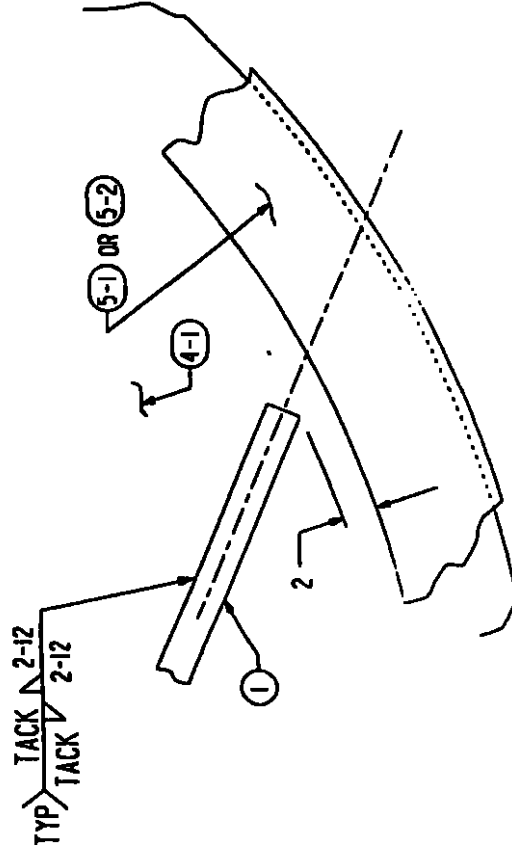
DETAIL C



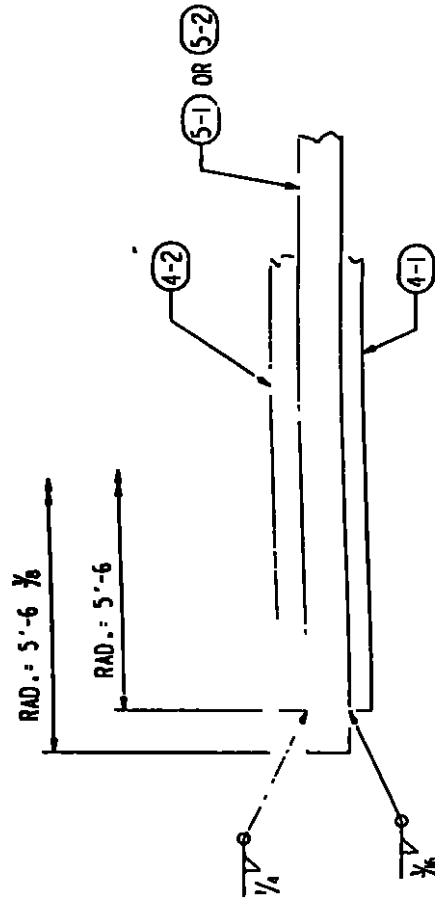
DETAIL D



DETAIL E



DETAIL B



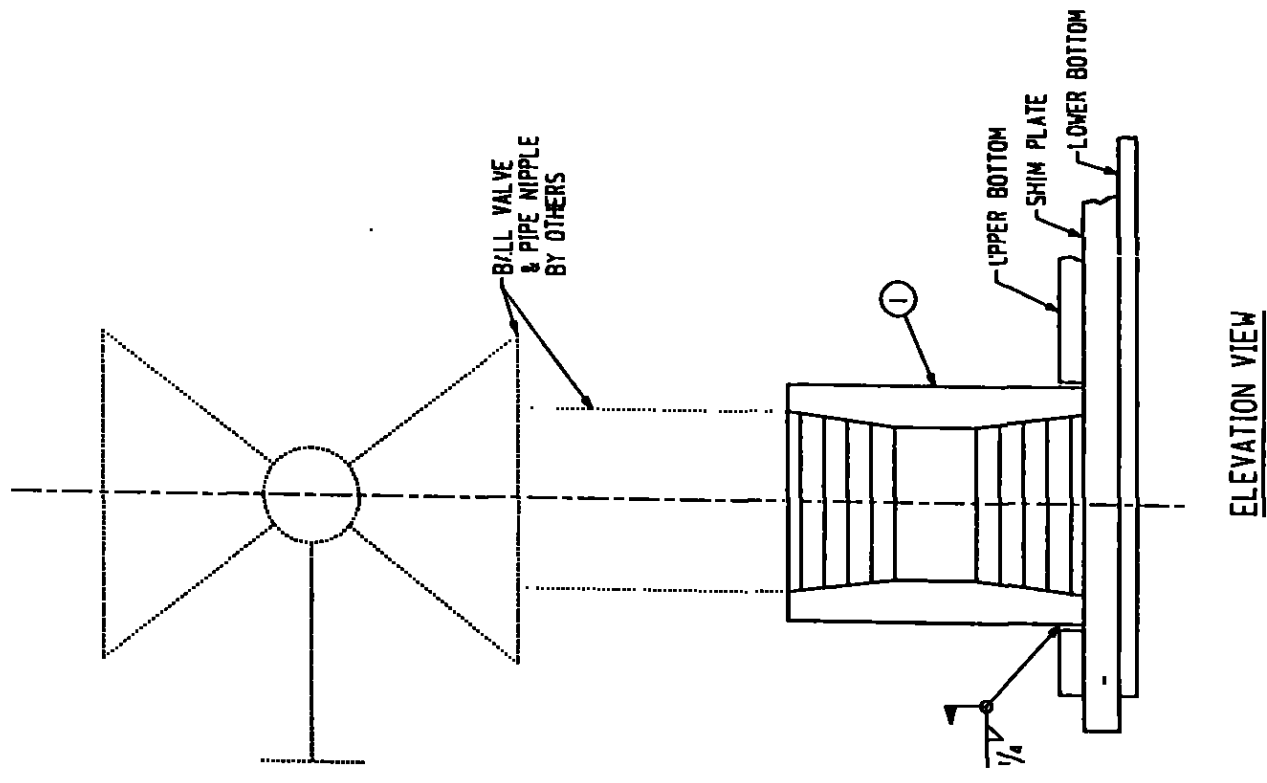
SECTION A-A

NOTES:

1. GRIND WELD FLUSH IN AREA OF (5-1) AND (5-2).
2. SEE DWG. #2 FOR ORIENTATION.
3. WORK THIS DWG. W/ DWGS. #4 & 5.

CBI		CUSTOMER'S NO.		CONTRACT NO.	
BOTTOM ASSEMBLY		BY: SSC, CROD 10-18-74		9620R1	
10'-6 DIA X 15'-5 HIGH D.R.I.		DESIGNED: J. GIL MEYERS		DATE: 3	
TANK 1A-400?		CYTEC INDUSTRIES, INC.		WESTWEGO, LA.	
REVISIONS		DATE		BY	
1		10-18-74		J. GIL MEYERS	
2		11-15-74		J. GIL MEYERS	
3		11-15-74		J. GIL MEYERS	
4		11-15-74		J. GIL MEYERS	
5		11-15-74		J. GIL MEYERS	

INDICATES CHANGE FROM PREVIOUS ISSUE



ELEVATION VIEW

QTY	MARK	ASSEMBLY	DESCRIPTION	LOC IN	SPEC	ID
2	17-1	COUPLER	1 1/2 DIA 3000 PSI R D		M182-364	D

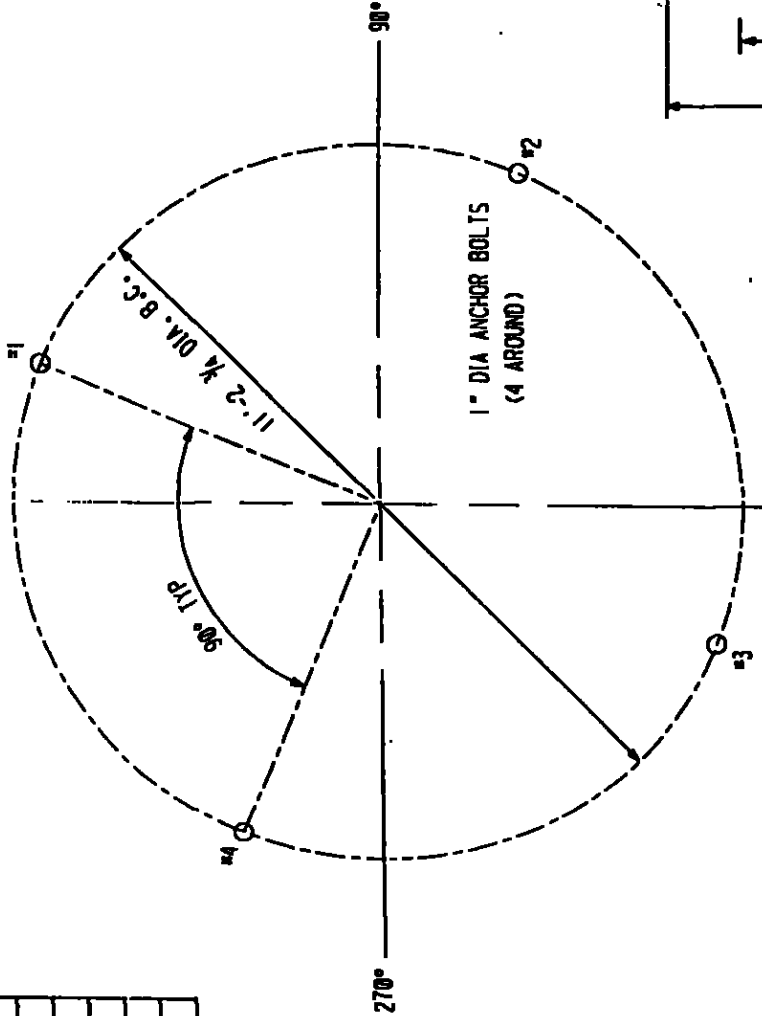
96-100-073
A-4

CBI		SAMPLES / REVISIONS	
LEAK DETECTION CPLG. 10'-6 DIA X 15'-5 HIGH D.E.T.			
TANK TA-4C2 CYTEC INDUSTRIES, INC. WESTMECO, I.A.			
CUSTOMER'S NO	DATE	BY	CHKD
96200	10-25-96	BLR	CHD
HOUSTON, TEXAS		ENGINEERING ASSIGNED	
1994			
NOT: DRAWING HAS BEEN REVISIONED FOR AND IS THE PROPERTY OF CBI INC. IT IS TO BE USED ONLY FOR THE PROJECT AND NOT BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF CBI INC.			

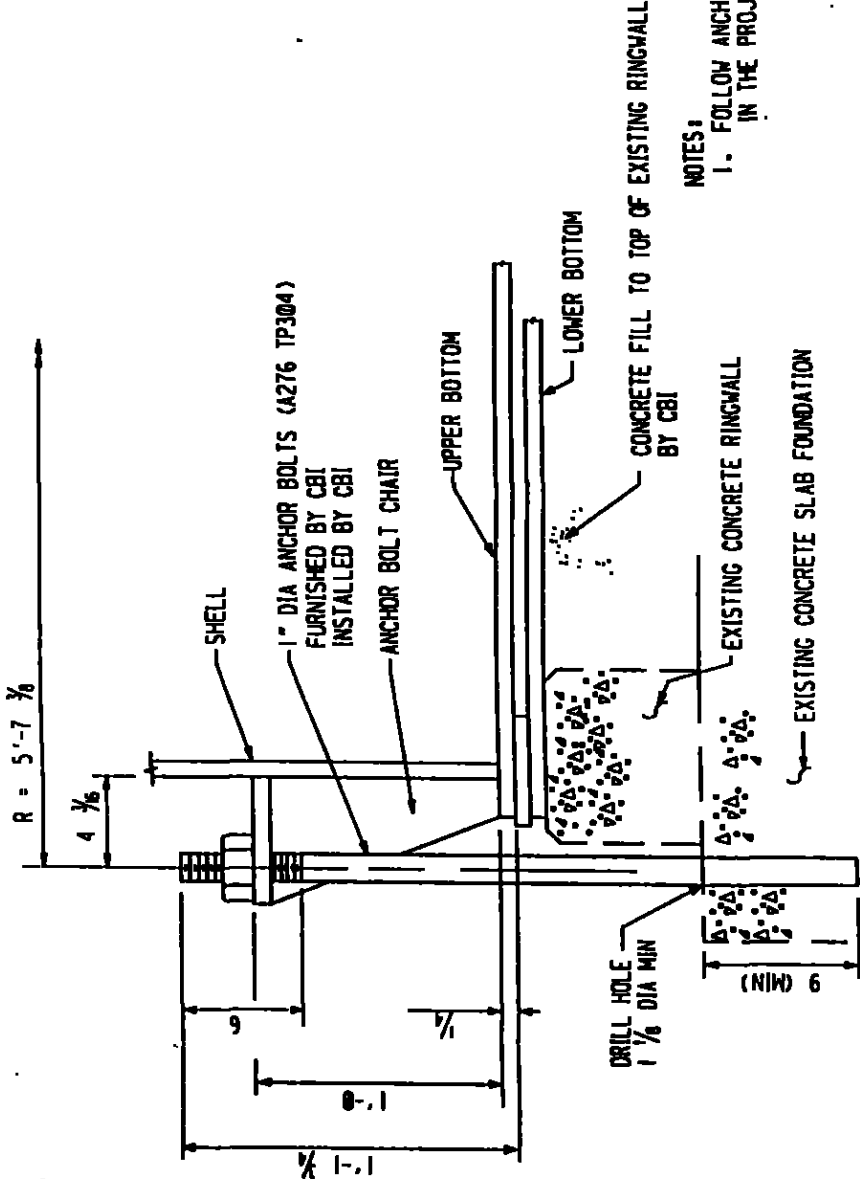
INDICATES CHANGE FROM PREVIOUS ISSUE

ANCHOR BOLT LOCATION	
CL. BOLT TO CL. BOLT	3'-0"
#1 TO #2	2'-2 1/2"
#2 TO #3	7'-11 3/4"
#3 TO #4	11'-2 1/4"

CUSTOMER NOTES:
1. CHORDS ARE FOR CHECKING PURPOSE ONLY.



ANCHOR BOLT
SETTING PLAN

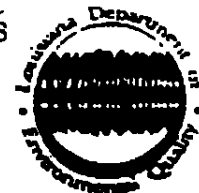


NOTES:
1. FOLLOW ANCHOR BOLT INSTALLATION PROCEDURE
IN THE PROJECT SPECIFICATIONS.

SECTION THRU ANCHOR BOLTS

		ANCHOR BOLT SETTING PLAN 10'-6 DIA X 15'-5 HIGH D.R.T. TANK TA-402 CYTEC INDUSTRIES, INC. WESTWEGO, LA.	
		CUSTOMER'S NO. 962081	CONTRACT NO. 962081
BY: <u>MB</u> <u>CHD</u> <u>DATE: 11-25-77</u> HOUSTON / C.B. METERS ENGINEERING ASSOCIATES		DATE: <u>11-25-77</u> BY: <u>MB</u> <u>CHD</u> CHECKED: <u>MB</u> <u>CHD</u>	REV: <u>0</u> BY: <u>MB</u> <u>CHD</u> CHECKED: <u>MB</u> <u>CHD</u>

INDICATES CHANGE FROM PREVIOUS ISSUE



State of Louisiana
Department of Environmental Quality

M.J. "MIKE" FOSTER, JR.
GOVERNOR

July 9, 1996

J. DALL GIVENS
SECRETARY

CERTIFIED MAIL (Z 012 943 057)
RETURN RECEIPT REQUESTED

Mr. T. E. Call, Plant Manager
Fortier Plant
Cytec Industries, Inc.
10800 River Road
Westwego, Louisiana 70094

JUL 12 1996

RE: TA-402 Wastewater Column Bottoms Tank Modification Request
Cytec Industries, Inc. (LAD 008 175 390)

Dear Mr. Call:

The Louisiana Department of Environmental Quality- Hazardous Waste Division (LDEQ-HWD) has reviewed your request dated June 5, 1996, requesting a modification determination for modification of Tank TA-402 to add a pressure relief device and to replace a three inch nozzle at the base of the tank.

The HWD has determined that this change, which will not substantially alter the permit nor reduce the capacity of the facility to protect human health and the environment, but will increase the safety of the unit, constitutes a Class 1 Permit Modification under LAC 33:V.321.C.4.b.i.

Therefore, the HWD hereby approves your modification request.

Pursuant to LAC 33:V.321.C.1.a.ii, Cytec must send a notice within ninety (90) days of the approved modification to all persons on the facility mailing list (which is maintained by the administrative authority in accordance with LAC 33:V.717.A.5) and to the appropriate units of state and local government, as specified in LAC 33:V.717.A.2 and 4. Please write the Department for an updated copy of the facility mailing list. The request for this service is outlined in the letter dated February 14, 1995, which was sent to all TSD facilities.

If you have any questions concerning this matter, please contact Ms. Toni Booker or Ms. Nora Lane at (504)765-0272.

Sincerely,

H. M. Strong
Assistant Secretary

HMS/TB/nvi

OFFICE OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE DIVISION

P.O. BOX 82178

BATON ROUGE, LOUISIANA 70894-2178

TELEPHONE (504) 765-3355

FAX (504) 765-0817

AN EQUAL OPPORTUNITY EMPLOYER



recycled paper





State of Louisiana
Department of Environmental Quality

Edwin W. Edwards
Governor

March 6, 1995

William A. Kucharski
Secretary

Certified Mail Z 030 805 297
Return Receipt Requested

Dr. D.J. Romanik
Plant Manager
Cytec Industries, Incorporated
Fortier Plant
10800 River Road
Westwego, Louisiana 70094

RE: Cytec Industries, Incorporated
LAD 008 175 390
Proposed Modification of Waste
Water Sock Filters

MAR 8 1995

Dear Dr. Romanik:

The Louisiana Department of Environmental Quality-Hazardous Waste Division (LDEQ-HWD) is in receipt of your letter dated August 17, 1995, requesting LDEQ approval of the preliminary design assessment for the proposed modifications of the waste water sock filters.

The LDEQ-HWD has conducted a technical review of your request, inclusive of the review and certification of the written assessment by an independent professional engineer registered in the state of Louisiana, and hereby approves Cytec's request.

The LDEQ-HWD has determined that the proposed changes constitute a Class I permit modification as defined by LAC 33:V.321.C.4.b.i. and LAC 33:V.322.A.3. Additionally, Cytec must comply with LAC 33:V.303.I requirements before putting the filter units into service.

Pursuant to LAC 33:V.321.C.1.a.ii, Cytec must send a notice within ninety (90) days of the modification to all persons on the facility mailing list, maintained by the administrative authority in accordance with LAC 33:V.717.A.5, and to the appropriate units of state and local government, as specified by LAC 33:V.717.A.2 and 4. Please contact the Department for an updated copy of the facility mailing list. The request for this service is outlined in the letter dated February 14, 1995, which was sent to all facilities.

OFFICE OF SOLID AND HAZARDOUS WASTE P.O. BOX 22173 BATON ROUGE, LOUISIANA 70884-2173

TELEPHONE (504) 765-0251 FAX (504) 765-0517

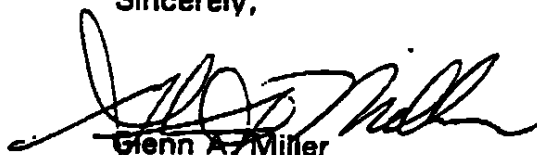
AN EQUAL OPPORTUNITY EMPLOYER



Dr. D.J. Romanik
Cytec Industries, Incorporated
Page 2

If you have any questions concerning this matter, please contact Mr. David Roberts or Mrs. Toni Booker at (504) 765-0272.

Sincerely,



Glenn A. Miller
Assistant Secretary-


GAM/FJH/fjh

c: Ms. Laurie F. King, USEPA, Region 6
Ms. Ann Zimmerman, USEPA, Region 6

Calculation Control File

TABLE OF CONTENTS

<u>DESCRIPTION</u>	<u>PAGE NO.</u>	<u>REVISION</u>
Table of Contents	TC-1	1
Design Summary	DES-1	0
Tank Design Sketch	SK-1	1
Program E1863A Summary	1	1
Foundation Loads	2	1
Foundation Loads	3	1
Program E1863A Input	4	1
Program E1863A Input	5	1
Program E1863A Output	6	1
Program E1863A Output	7	1
Program E1863A Output	8	1
Anchor Bolt Chair	9	1
Anchor Bolt Chair	10	1
Anchor Bolt Chair	11	1

SUBJECT 10'-6 DIA X 15'-5 HIGH DRT CYTEC INDUSTRIES, INC. WESTWEGO, LA	<div>OFFICE</div> <div> PPH</div>		<div>REVISION</div> <div>1</div>		<div>REFERENCE NO.</div> <div>962081</div>
	<div>MADE BY</div> <div>JWB</div>	<div>CHKD BY</div> <div>GBM</div>	<div>MADE BY</div> <div>JWB</div>	<div>CHKD BY</div> <div>GBM</div>	<div>SHT TC-1 OF</div>
	<div>DATE</div> <div>10/23/96</div>	<div>DATE</div> <div>10/23/96</div>	<div>DATE</div> <div>11/1/96</div>	<div>DATE</div> <div>11/1/96</div>	

CBI ENGINEERING PROGRAM E1863A INTERACTIVE DESIGN OF FLAT BOTTOM TANKS

CBI's proprietary computer program E1863A designs flat bottom storage tanks in accordance with user specified design conditions and to any of the following design specifications:

API 650

AWWA D100

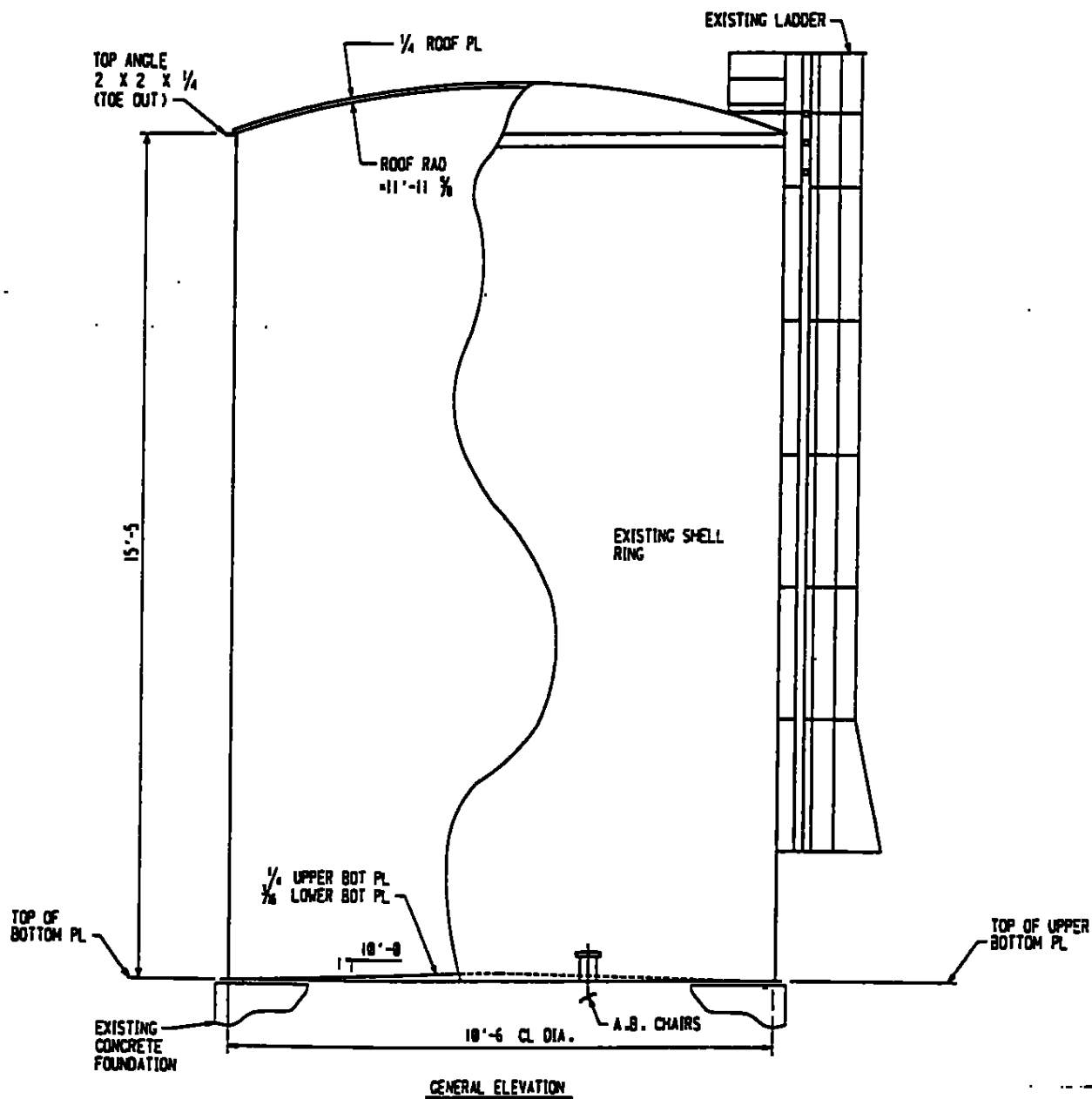
API 620

The equations used in the program are the same as those found in the above design standards for the applicable analysis functions performed in the design. All designs performed by this program incorporate CBI's minimum proprietary design basis which may, in some instances, exceed user requirements or those given in the above national design standards.

Program E1863A performs the following functions:

1. Design of the cylindrical shell for liquid and gas pressure, as applicable, utilizing either the fixed or variable point design method.
2. Check for shell buckling due to wind.
3. Check of overturning stability under wind load.
4. Check of seismic induced stresses using the procedures of API 650 Appendix E, API 620 Appendix L, AWWA D100 Fixed Percentage Method, or AWWA D100 Section 13 as applicable.
5. Check of overturning stability under seismic conditions.
6. Check of bottom/annular plate thickness and width for seismic hold-down.
7. Determination of anchor bolt requirements for pressure, wind, and/or seismic conditions.
8. Determination of foundation loads.
9. Checks for the required area at the roof-to-shell junction when the internal gas pressure would tend to lift the roof plates (API 650 Appendix F only).

LOCKED



CU64.DCN

SUBJECT 10'-6 DIA X 15'-5 HIGH DRT CYTEC INDUSTRIES, INC. WESTWEGO, LA	CBI PPH OFFICE		REVISION - 1		REFERENCE NO. 962081
	MADE BY JWB	CHKD BY GBM	MADE BY JWB	CHKD BY GBM	SHT SK1 OF ____
	DATE 10-23-96	DATE 10-23-96	DATE 11-1-96	DATE 11/1/96	

DESIGN SUMMARY SHEET
FLAT BOTTOM TANK

96-100-073
A-14

10'-6 DIA X 15'-5" DRT CYTEX WESTWEGO, LA 62081.2 JWB 11-1-96

TANK NO. TA-402 DIAMETER: 10.500 FT. HEIGHT: 15.417 FT
DESIGN SPECIFICATION: API 650 APPS
PRODUCT: WWCB INJECTION S G PRODUCT: 1.000 PRODUCT DESIGN HT: 15.417 FT
DESIGN METAL TEMP: 200°F WIND: 110. MPH SEISMIC: ZONE 0. PRESSURE: 0.40 PSI
CORROSION ALLOWANCE (S/R/B): 0.000/ 0.000/0.0000 IN.; ROOF LOAD: 25.000 PSF
OTHER DESIGN SPECIFICATIONS: _____

	WIDTH INCHES	THICKNESS INCHES	MATERIAL	WEIGHT LBS	NOTES
ROOF PLATE		0.250	304 L	944.	SLW DOME R/D = 1.14
FRAMING KNUCKLE					
TOP ANGLE	§ 2x2x¼		304 L	105.	TOE OUT
TOP WINDGIRDER					
SHELL RINGS (STARTING AT BOTTOM)					
1	183.000	0.3125	316L	6414.	CUT FROM EXISTING VESSEL
AVERAGE THICKNESS = 0.312			TOTAL SHELL WT. =	6414.	
ANGULAR PLATE					
BOTTOM PLATE	UPPER BTM	0.250	304 L	959.	DBL BTM "CONSLO" DET. SPLTER BRGS B/W B-TM.
D 1 1/2" TO BOTTOM WT. FOR LAP WELDED BOTTOM)					
4 ANCHOR BOLTS REQUIRED	1.000	INCH	DIAMETER		
ANCHOR BOLT CHAIR HEIGHT:	12.	INCHES			
ALLOWABLE WIND VELOCITY ON UNSTIFFENED SHELL (AS-BUILT):				790.2	MPH
LOWER BTM IS 3/16 THICK ; 304L MAT'L			USE 3/8 SHIMS		DBW BOTH BOTTOMS

CBI

MADE BY: RAD/JWB CHKD BY: GBM CONTRACT NO: 962081
DATE: 10-14-96 DATE: 10-16-96 SHEET 1 OF 1

REV 1 MADE BY: JWB CHKD BY: GBM
DATE: 11-1-96 DATE: 11/1/96

FOUNDATION LOAD SHEET
FLAT BOTTOM TANK

96-100-073
A-13

10'-6 DIA X 15'-5" DRT CYTEX WESTWEGO, LA 62081.2 JWB 11-1-96

PRODUCT WWCB INJECTION
MAXIMUM DEPTH OF PRODUCT=

SPECIFIC GRAVITY 1.000
15.417 FT

TOTAL TANK METAL WEIGHT

(DOES NOT INCLUDE ADDITIONAL WEIGHT ON ROOF) = 8.4 KIPS
ADDED LOAD ON ROOF= 0.0 KIPS

METAL LOAD AT BASE OF SHELL

(SHELL PLUS ROOF ON SHELL) = 18.9 LBS/IN
LIVE LOAD ON SHELL (25.00 PSF) = 5.5 LBS/IN

WIND (110.0 MPH PER API 650)

SHEAR= 3.7 KIPS
MOMENT= 29.7 FT-KIPS

INTERNAL PRESSURE=

PRESSURE UPLIFT ON SHELL= 0.40 PSI
12.5 LBS/IN

R E M A R K S

ANCHORAGE IS REQUIRED

CBI

MADE BY: RAM/JWB CHKD BY: GBM CONTRACT NO: 962081
DATE: 10-14-96 DATE: 10-16-96 SHEET 2 OF

REV 1

MADE BY: JWB CHKD BY: GBM
DATE: 11-1-96 DATE: 11/1/96

SUMMARY FOR ENGINEERING FOUNDATION DRAWING
FLAT BOTTOM TANK

96-100-073
A-16

10'-6 DIA X 15'-5" DRT CYTEX WESTWEGO, LA 62081.2 JWB 11-1-96

OVERTURNING MOMENTS:

WIND RINGWALL FOUNDATION MOMENT=	29.7	FT-KIPS
SEISMIC RINGWALL FOUNDATION MOMENT=	0.0	FT-KIPS
SEISMIC SLAB MOMENT=	0.0	FT-KIPS

MAX UPLIFT PER BOLT:

API 650 APP F.4 APPLIES

NORMAL OPER=	-0.63	KIPS
OPER + WIND=	2.20	KIPS
OPER + SEISMIC=	0.00	KIPS
TEST=	-0.63	KIPS

DESIGN DATA FOR FOUNDATION LOADS:

API 650 APP F.4 APPLIES

PRODUCT DESIGN SP GR =	1.000	
WIND=	110.	MPH
SEISMIC ZONE: 0. S: 0.000 K: 0.000	Z: 0.000	
ROOF LIVE LOAD=	25.000	PSF
INTERNAL DESIGN PRESSURE=	0.397	PSI
INTERNAL TEST PRESSURE: CONSULT TANK DESIGNER		

FOUNDATION LOADS:

SEISMIC LOAD=	0.00	LBS/FT
WIND LOAD=	342.46	LBS/FT
AS-BUILT METAL LOAD=	226.26	LBS/FT
CORRODED METAL LOAD: CONSULT TANK DESIGNER		
ROOF LIVE LOAD=	65.6	LBS/FT
DESIGN PRESSURE=	150.1	LBS/FT

WT. OF PRODUCT=	962.00	PSF
WT. OF WATER=	962.00	PSF
WT. OF BOTTOM=	10.20	PSF
(WT. OF BOTTOM DOES NOT INCLUDE ANNULAR PLATE DESIGN IF REQUIRED OR LAP WTS FOR LAP WELDED JOINT)		
DESIGN PRESSURE=	57.17	PSF

BASE SHEAR:

WIND=	3.7	KIPS
SEISMIC=	0.0	KIPS

NOTES:

OFFICE		REVISION		REFERENCE NO.
PPIH		1		962081
MADE BY	CHKD BY	MADE BY	CHKD BY	SHT 3 OF
RAD/JWB	GBM	JWB	GBM	
DATE	DATE	DATE	DATE	
10-14-96	10-23-96	11-1-96	11/1/96	

PROGRAM E1863A [IBM COMPATIBLE PC]
 INTERACTIVE FLAT BOTTOM TANK DESIGN
 REVISION 12 - DECEMBER 19, 1994 DATA SHEET REV 5

96-100-073
 A-17

6 DIA X 15'-5" DRT CYTEX WESTWEGO, LA 62081.2 JWB 11-1-96

I N P U T D A T A

ATA DIAMETER SHT REV	SHELL HEIGHT (FT)	PRODUCT HEIGHT (FT)	DESIGN CODE	SPEC.GRAV. TEST	PROD.	SHELL CHKPT
5	10.500	15.417	API 650	1.000	1.000	1.0

WIND VEL. MPH)	WIND DES.	CORR. ALLOW. (IN)	MIN. THICK (IN)	NO. OF SHELL RINGS	NO. OF MATERIALS	TOP ANGLE VERT LEG (IN)	1ST COURSE MIN. YIELD (KSI)
110.0	TS	0.0000	0.3125	-1	1	2.000	21.10
110.0 EQUIVALENT VELOCITY							

NO.	MATERIAL	PRODUCT STRESS (PSI)	TEST STRESS (PSI)
1	316L	19000.	21000.

ROOF CARD

ROOF TYPE	LIVE LOAD (PSF)	ROOF THK (IN)	ROOF CORR (IN)	NO. RAFT	RAFT RAD (FT)	RAFT WT (LBS/FT)	ADD. WT (LBS)
1.140	25.0	0.2500	0.0000	0	0.000	0.0	0.

BASE CARD

ROOF THK (IN)	BOTT CORR (IN)	BASE YLD (PSI)
0.2500	0.0000	21400.

EQ CARD

EQ ZONE	S FACT	K FACT	Z FACT	FS	OPT VAL	VERT FACT
0.000	0.000	0.000	0.000	0.000	0.000	0.000

WIND CARD

IND OPT	WIND STIFF OPTION	XHMU (IN)	XHML (IN)	GIRD TYPE	OFFSET (IN)	STABILITY FACTOR
1	3	0.000	0.000	0	0.000	1.5140

RES CARD

PRESSURE (PSI)	VACUUM (PSI)	TOP L:	AREA (SQ IN)	HORIZ (IN)	THICK (IN)	ORIENT 1-OUT, 2-IN	DELTA (IN)
0.397	0.047		-0.938	2.000	0.250	1	1.000

COMP BAR:	AREA (SQ IN)	DELTA (IN)	COMB LOADS?
	0.000	0.000	1

JOINT CARDS

JOINT DIA.	ALLOW. AXIAL TENSION (KIPS)		
CASE 1	CASE 2	CASE 3	CASE 4
9.	12.	12.	0.

JOINT CARDS

E A

SHELL BENDING STRESS

MIN. OFFICE NO		REVISION		REFERENCE NO.
CASE 5				962081
CHKD BY	MADE BY	CHKD BY	SHT 4 OF	
68M	JWB	68M		
DATE	DATE	DATE	DATE	
11-1-96	11-1-96	11-1-96	11-1-96	

(IN)
4.187

(IN)
6.250

CASE 1
14.3

CASE 2
19.1

CASE 3
19.1

CASE 4
0.0

CASE 5
0.0

96-100-073
A-18

OFFICE PDH		REVISION 1		REFERENCE NO. 962081
MADE BY RAD/JWB	CHKD BY GBM	MADE BY JWB	CHKD BY GBM	SHT. 5 OF
DATE 10-14-96	DATE 10-23-96	DATE 11-1-96	DATE 11/1/96	

O U T P U T D A T A

96-100-073

A-19

10'-6 DIA X 15'-5" DRT CYTEX WESTWEGO, LA 62081.2 JWB 11-1-96

	T	T	CONTROLLING	MATERIAL	DESIGN	WEIGHTS			
PING	WIDTH	CORR.	NOM.	CONDITION	TYPE	NO.	POINT	AS BUILT	CORR.
1	183.0	0.3125	0.3125	T MIN	316L	1	12.00	6414.	6414.
TOTAL WEIGHTS								6414.	6414.

RESSURE X AREA= 4950. LBS
 NOMINAL TANK WEIGHT= 7463. LBS
 COMPRESSION AREA IS ADEQUATE

	AS BUILT	CORRODED
REA REQUIRED=	0.07 SQ IN	0.07 SQ IN
AREA SUPPLIED=	1.59 SQ IN	1.59 SQ IN
FAILURE PRESSURE=	349.8 IN. OF WATER	349.8 IN. OF WATER

*****THIS PROGRAM CHECKS THE COMPRESSIVE AREA REQUIRED,
 THE USER MUST CHECK THE TENSION AREA REQUIRED
 (SELF-SUPPORTING ROOFS ONLY) PER API 650 3.10.5 & 3.10.6

ALLOWABLE VELOCITY ON UNSTIFFENED SHELL = 790.2 MPH

TANK DOES NOT REQUIRE WIND GIRDER OR STIFFENING

WIND OVERTURNING FACTOR IS 2.25
 ANCHORAGE IS REQUIRED FOR WIND

UPLIFT: 22. LBS/IN

***** NOTE ***** 1" (25MM) MINIMUM DIAMETER ANCHOR BOLTS ARE
 PERMISSIBLE ONLY WITH PLAINFIELD PLATE STRUCTURES DESIGN APPROVAL,
 OTHERWISE USE 1.25" (32MM) MINIMUM.

OFFICE PDH		REVISION 1		REFERENCE NO. 962081
MADE BY RAD/JWB	CHKD BY GBM	MADE BY JWB	CHKD BY GBM	SHT. 6 OF
DATE 10-14-96	DATE 10-23-96	DATE 11-1-96	DATE 11/1/96	

ANCHOR BOLT DESIGN

BOLT OPTION	BOLT DIAMETER (IN)	NO. OF BOLTS	BOLT SPACING (IN)	CHAIR HEIGHT (IN)
1	1.000	4.	98.96	12.

ANCHOR BOLT LOADS FOR THE OPTION SELECTED (KIPS)

OPTION 1 SELECTED

NO. OF BOLTS	DESIGN PRES	DESIGN PRES + WIND	DESIGN PRES + SEISMIC	TEST PRES	1.5 X FAIL. PRES
4.	-0.63	2.20	0.00	-0.63	NA

OFFICE PPH		REVISION 1		REFERENCE NO. 962081
MADE BY RAD/JWB	CHKD BY GBM	MADE BY JWB	CHKD BY GBM	SHT. 7 OF
DATE 10-14-96	DATE 10-23-96	DATE 11-1-96	DATE 11/1/96	

FIXED POINT DESIGN THICKNESSES

96-100-073
A-21

NG
NUM.

PRODUCT
THICKNESS
(IN)

HYDROTEST
THICKNESS
(IN)

1

0.0207

0.0187

NOTE: THICKNESSES DO NOT INCLUDE CORROSION ALLOWANCE

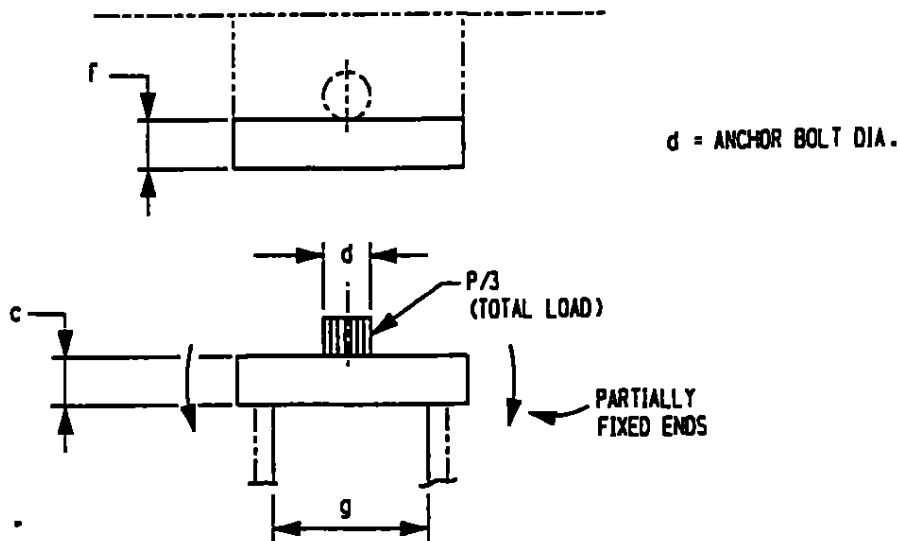
DO NOT LIST THE HYDROSTATIC THICKNESSES ON THE
GENERAL PLAN UNLESS IT IS REQUIRED BY THE
GOVERNING DESIGN CODE.

OFFICE RPM		REVISION 1		REFERENCE NO. 962051
MADE BY RADJWB	CHKD BY GBM	MADE BY JWB	CHKD BY GBM	SHT. 8 OF
DATE 10-14-96	DATE 10-23-96	DATE 11-1-96	DATE 11/1/96	

TOP PLATE DESIGN

96-100-073
A-22

NOTE: CRITICAL STRESS OCCURS BETWEEN THE HOLE AND THE FREE EDGE OF THE PLATE.



$$c = [P(0.375g - 0.22d)/Sf]^{0.5}$$

$$s = \frac{19.019}{\text{KSI (ALLOW)}}$$

$$c = \frac{0.475}{\text{IN. MIN.}} \quad \text{USE } c = \frac{0.500}{\text{IN.}}$$

GOVERNED BY DESIGN LOAD OPERATING + WIND (CORR.)

* ANCHOR BOLT CHAIR HEIGHT

$$\text{ASSUME } h = \frac{12.0}{\text{IN.}} \quad a = \frac{6.250}{\text{IN.}} \quad m = \frac{0.250}{\text{IN.}} \quad t = \frac{0.313}{\text{IN.}}$$

$$S_1 = \frac{P_e}{t^2} \left[\frac{1.32 (\overline{RE})}{\frac{1.43 a h^2}{R t} + (4 a h^2)^{0.3333}} + \frac{0.031}{(R t)^{0.5}} \right]$$

$$S_1 = \frac{3.219}{\text{KSI}}$$

$$\text{WHERE } (\overline{RE}) = \frac{1.0}{\frac{0.177 a m}{(R t)^{0.5}} \left(\frac{m}{t} \right)^2 + 1.0}$$

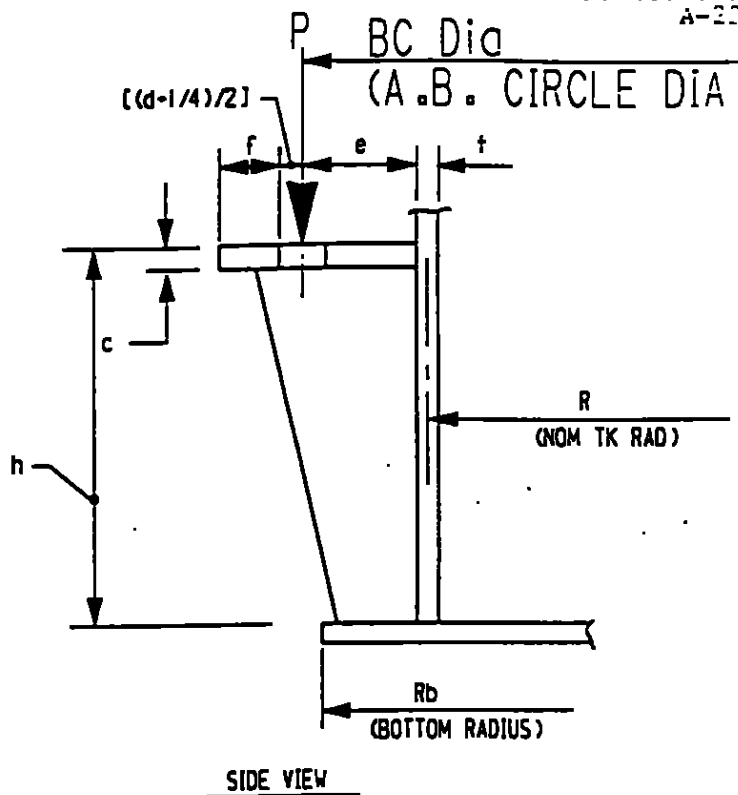
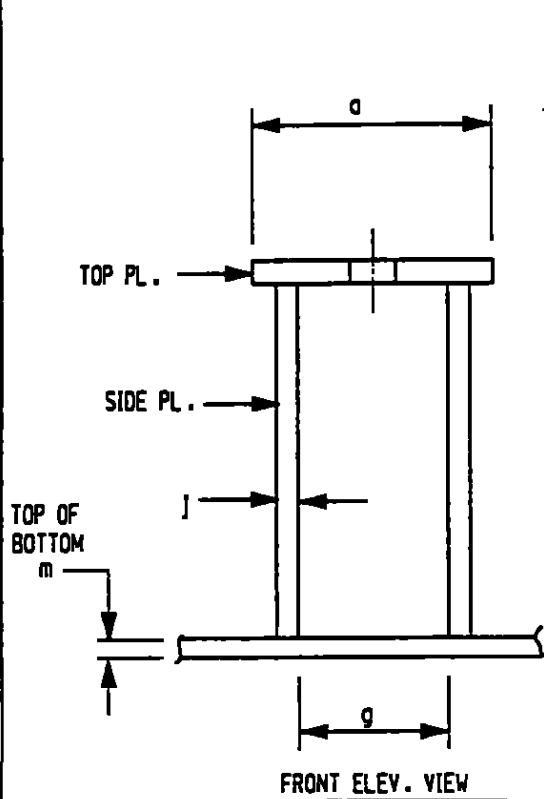
$$h = \frac{12.0}{\text{IN.}} \quad \text{O.K. SINCE } S_1 = \frac{3.219}{\text{KSI}} < S = \frac{19.019}{\text{KSI}}$$

GOVERNED BY DESIGN LOAD OPERATING + WIND (CORR.)

- * - FORMULAS USED ARE APPROXIMATIONS, BASED ON THE WORK OF BIJLAARD. MAX STRESS OCCURS IN THE COMBINATION OF BENDING PLUS DIRECT STRESS.

SUBJECT ANCHOR BOLT CHAIRS FOR F.B. TANK 10'-6 DIA X 15'-5 HIGH DRT CYTEC INDUSTRIES, INC. WESTWEGO, LA	OFFICE PPH		REVISION 1	REFERENCE No. 962081
	MADE BY JWB	CHKD BY GBM		
	DATE 10/18/96	DATE 10/23/96	DATE 11/1/96	
			DATE 11/1/96	SHT 9 OF

PROGRAM C0133N 62081008.DGN



S = 14.300 KSI (ALLOW)

BC = 134.750 IN.

Rb = 66.0 IN.

d = BOLT DIA = 1.0 IN.

R = 63.031 IN.

a = 6.250 IN.

e = 4.188 IN.

f = 0.625 IN.

g = 2.750 IN.

j = 0.500 IN.

m = 0.250 IN. (CORR.)

t = 0.313 IN. (CORR.)

m = 0.250 IN. (AS BUILT)

t = 0.313 IN. (AS BUILT)

P = 3.300 (KIPS) DESIGN LOAD OPERATING + WIND (CORR.)

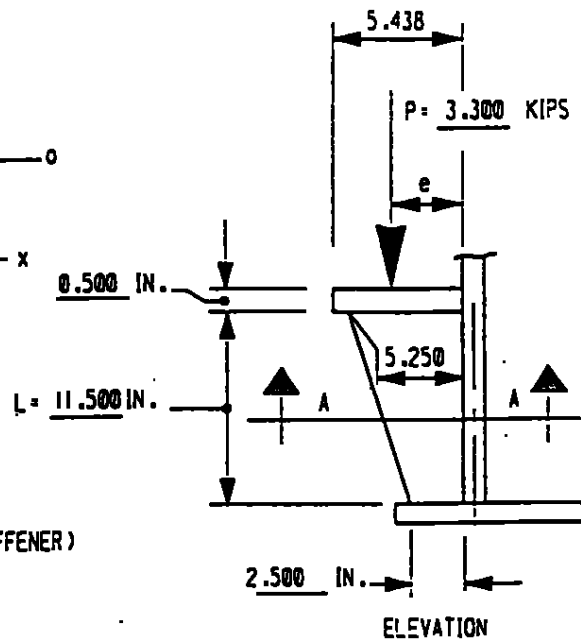
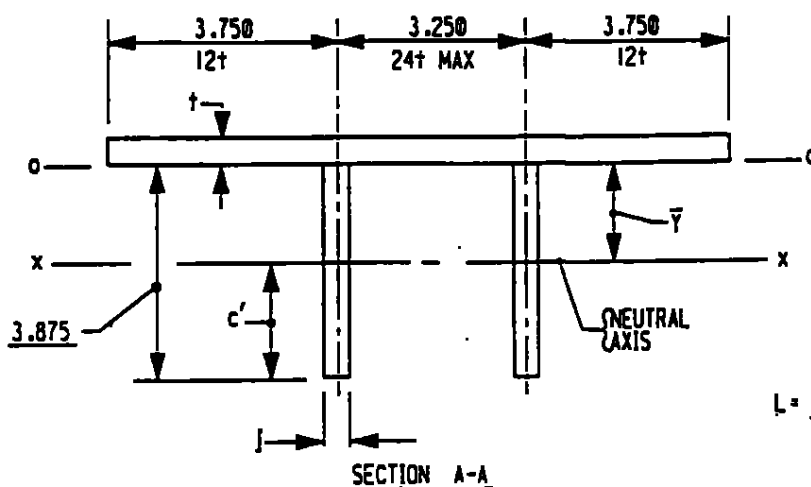
62081008.DGN

PROGRAM C0133N

SUBJECT		OFFICE		REVISION		REFERENCE No.	
ANCHOR BOLT CHAIRS FOR F.B. TANK		CBI PPH		1		962081	
10'-6 DIA X 15'-5 HIGH DRT		MADE BY		MADE BY		SHT 10 OF	
CYTEC INDUSTRIES, INC.		JWB		JWB			
WESTWEGO, LA		GBM		GBM			
		DATE		DATE			
		10/18/96		11/1/96			
		10/23/96		11/1/96			

$$t = 0.313 \text{ IN.}$$

$$\text{ASSUME } J = 0.500 \text{ IN. } (2 \frac{1}{2} \text{ IN.})$$



(PROPERTIES TAKEN • MID HEIGHT OF STIFFENER)

AREA : A = CROSS SECTIONAL AREA

$$\Sigma A = 7.234 \text{ IN}^2$$

$$\bar{Y} = \Sigma M_o / \Sigma A = 0.965 \text{ IN. (ABOUT AXIS X-X)}$$

MOMENT OF INERTIA : I_x = MOMENT OF INERTIA OF SECTION ABOUT AXIS X-X

$$\Sigma I_x = 12.764 \text{ IN}^4 \text{ (ABOUT AXIS X-X)}$$

$$\text{RADIUS OF GYRATION : } r_x = (\Sigma I_x / \Sigma A)^{0.5} = 1.328 \text{ IN.}$$

UNITY FORMULA, $(f_a/F_a) + (f_b/F_b) \leq 1.00$
• MID HEIGHT MUST BE SATISFIED.

$$F_y = 21.400 \text{ KSI (YIELD STRENGTH OF VERTICAL SIDE PLATE MATERIAL)}$$

$$SIN = 0.330 \text{ (STRESS INCREASE FOR VERTICAL SIDE PLATES FOR THIS LOADING CONDITION)}$$

$$f_a = P / \Sigma A = 0.456 \text{ KSI}$$

$$F_a = 16.853 \text{ KSI} \quad \left\{ \begin{array}{l} \text{BASED ON AISC-8TH EDITION} \\ \text{FOR MATL } F_y \text{ 21.400 AND } L/r = 8.658 \end{array} \right\} \text{ THIS INCLUDES THE INCREASE FOR SIN}$$

$$f_b = M_c / \Sigma I_x = 2.424 \text{ KSI (M = P (e - \bar{Y}) \quad \& \quad c' = 2.910)}$$

$$F_b = .6 F_y (1.0 - SIN) = 17.077 \text{ KSI}$$

$$(f_a/F_a) + (f_b/F_b) = 0.169 \quad \text{GOVERNED BY DESIGN LOAD OPERATING • WIND (CORR.)}$$

$$\text{SINCE } 0.169 \leq 1.00 \text{ THEN } 0.500 \text{ " THICK SIDE PLATES O.K.}$$

SUBJECT ANCHOR BOLT CHAIRS FOR F.B. TANK 10'-6 DIA X 15'-5 HIGH DRT CYTEC INDUSTRIES, INC. WESTWEGO, LA	OFFICE PPH		REVISION 1		REFERENCE No. 962081
	MADE BY JWB	CHKD BY GBM	MADE BY JWB	CHKD BY GPI	SHT 11 OF
	DATE 10/18/96	DATE 10/23/96	DATE 11/1/96	DATE 11/1/96	

PROGRAM C0133N 62081008.DCN

CYTEC

To: Vincent Diaz

Date: January 10, 1996

Location: Fortier

Copy to: F. Whiteley
J. Schneller
A. Junker
J. Meyer
S. Eccel
P. Savoy

From: Guy C.A. Rich

Location: Fortier

Subject: Injected Waste Analysis.

Reference: NB 1175, pp. 182-186 (G. Rich); DWAM9505.SEQ, Lines 55-62 (PC Rm 9);
DWMA9506.SEQ Lines 44-48 (PC Rm 9). MMEX9505.SEQ, Lines 200-211 (PC Rm. 9);
NB 1167, pp. 140-145 (J. Meyer); DW121495.SEQ (PC Rm. 4); NB 1213, p. 10 (C.J.
Wusnack, PC Rm. 3.

File Name: C:\6WINWORD\ENV\DW4Q95.DOC

Contributors: V. Diaz, J. Meyer, C.J. Wusnack

SAMPLE HISTORY

Comprehensive knowledge of the character and composition of these materials is necessary for environmental and tax purposes prior to deep well injection.

SAMPLE DESCRIPTION

Analysis was performed on composites of samples collected on December 6, 7, and 8, 1995.

RESULTS

	Waste Acid Composite	Waste Water Composite	MET Composite	NSB Composite
Acetone, ppm	820	<10	195	<10
Acrylamide, ppm	-	1100	135	38
Acrylic Acid, ppm	-	5500	250	620
Acrylonitrile, ppm	-	90	23	<10
Acetonitrile, ppm	-	580	6100	<10
Methanol, ppm	7600	<10	156	<10
MMA, ppm	880	<10	14	<10
Toluene, ppm	-	<0.050	2.2	<0.050
Formic Acid, ppm	-	840	108	82
Acetic Acid, ppm	-	1180	186	390
Methacrylic acid, ppm	1940	-	-	-
Fumaronitrile, ppm	-	1470	<10	136
Succinonitrile, ppm	-	62	1380	3800
Benzene, ppm	<0.05	<0.050	<0.050	<0.050
Pyridine	-	260	<10	<10

**CYTEC INDUSTRIES INC.
Waggaman, Louisiana**

EPA ID No.: LAD008175390

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT TANK
INSTALLATION CERTIFICATION
WWCB Well Injection Tank (TA-402)**



Report No. 97-2025M03

May 1997



WILLIAM H. LINDER
CHAIRMAN

LAWRENCE J. CACIOPPO, P.E.
PRESIDENT

HAZARDOUS WASTE TANK SYSTEM REPLACEMENT TANK INSTALLATION CERTIFICATION

I have performed an assessment of the installation of a replacement for existing WWCB Well Injection Tank TA-402 at the Cytec Industries Inc. Fortier Plant located in Waggaman, Louisiana. The EPA ID Number for this facility is LAD008175390. The assessment performed is described and documented in the attached W.H. Linder & Associates, Inc. (LINDER) Report No. 97-2025M03, dated May 13, 1997. This assessment was performed to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 (b-f) and the corresponding State of Louisiana requirements in LAC 33:V.1905 (B-F).

With regard to this duty, I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my observations and my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Thomas H. Wimbrow
Registered Professional Engineer
Louisiana No. 23062

W.H. Linder & Associates, Inc.
3300 West Esplanade Avenue, Suite 300
Metairie, Louisiana 70002

Signed: 

Date: MAY 13, 1997



WILLIAM H. LINDER
CHAIRMAN

LAWRENCE J. CACIOPPO P.E.
PRESIDENT

May 13, 1997
97-2025M03

Ms. Stacy Foret
Cytec Industries Inc.
10800 River Road
Westwego, Louisiana 70094

**Subject: Replacement Tank Installation Assessment
WWCB Well Injection Tank (TA-402)**

Dear Ms. Foret:

Submitted here is our installation assessment report for the installation of the replacement for the existing WWCB Well Injection Tank (TA-402) at Cytec's Fortier Plant. Our reviews and inspections were performed to assess compliance with the requirements of 40 CFR 264.192 and LAC 33:V.1905.

The body of the report summarizes assessment results in a format corresponding to the rules being addressed. Detailed information and documentation are presented in an Appendix.

The assessment confirmed that the tank replacement met the requirements of LAC 33:V.322.G.3 for classification as a Class 1 permit modification since it met all of the following criteria:

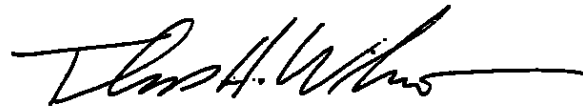
- i. The replacement tank meets the same design criteria as the original (API 650);
- ii. The replacement tank has a capacity within + or - 10 percent of that of the original tank (there was no change in capacity);
- iii. The capacity difference is not more than 1500 gallons (there was no change in capacity);
- iv. The facility's permitted tank capacity is not increased (there was no change in capacity); and
- v. The replacement tank meets the same conditions specified in the permit (there was no change in the tank design conditions).

Ms. Stacy Foret
Cytec Industries Inc.
Page 2

97-2025M03
May 13, 1997

We have enjoyed working with you on this project, and look forward to another opportunity to be of service to Cytec. Please call me at 504-835-2577 if you have any questions.

Sincerely,



Thomas H. Wimbrow, P.E.
Sr. Environmental & Mechanical Engineer

Attachment: LINDER Report No. 97-2025M03

MAY 13, 1997

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT TANK
INSTALLATION CERTIFICATION
WWCB Well Injection Tank (TA-402)**

For:

**CYTEC INDUSTRIES INC.
Waggaman, Louisiana**

By:

**W.H. Linder & Associates, Inc.
Metairie, LA**

Report No. 97-2025M03

May 1997

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
DESCRIPTION OF REPLACEMENT	1
INSTALLATION ASSESSMENT	2
Leak Testing	2
Visual Inspection	3
Ultrasonic Thickness Measurements	3
UNDERGROUND COMPONENTS	3
TIGHTNESS TESTING	3
ANCILLARY EQUIPMENT	4
CORROSION PROTECTION	4
CONCLUSIONS OF ASSESSMENT	4

ILLUSTRATIONS

Effluent / WWCB Filtration P&ID (Cytec Dwg. No. 10-0-119 Issue 12)

CBI General Arrangement Drawing Contract No. 962081 Dwg. 1 Rev. 3

APPENDIX - Inspection Documentation

**HAZARDOUS WASTE TANK SYSTEM
REPLACEMENT TANK INSTALLATION ASSESSMENT**

WWCB WELL INJECTION TANK TA-402

This report documents an installation assessment performed for the replacement of the existing WWCB Well Injection Tank (TA-402) at the Cytec Industries Inc. Fortier Plant in Waggaman, Louisiana. The EPA ID No. for this facility is LAD008175390. This assessment was performed and this report was prepared to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 (b-f) and the corresponding State of Louisiana requirements in LAC 33:V.1905 (B-F).

DESCRIPTION OF REPLACEMENT

The existing WWCB Well Injection Tank was a vertical flat-bottom tank with a cone roof. It was constructed of carbon steel with a rubber lining and had a capacity of approximately 10,000 gallons. It was supported by a reinforced concrete foundation located inside a concrete secondary containment area. The new tank is of similar design and equivalent capacity, but it is provided with a double bottom and is constructed of stainless steel to provide improved corrosion resistance and greater protection of human health and the environment. The replacement tank has been installed in the same location and service as the previous tank.

An assessment of the design of the replacement tank was performed by TERA, Inc. and is documented in TERA Report No. 96-100-73. The scope of this report is limited to assessment of the installation and leak testing of the replacement tank and a new pipe spool connecting the new tank to the existing piping system.

INSTALLATION ASSESSMENT (LAC 33:V.1905 B)

An installation assessment was performed by W.H. Linder & Associates, Inc. to:

- a) verify correspondence between the system design documentation, applicable standards, and the actual condition of the system, and
- b) detect installation damage, defective construction, or other defects in the new system components.

Assessment methods used included hydrostatic leak testing, visual inspection, and ultrasonic thickness measurement of the replacement tank and piping spool. Tests and inspections were performed both prior to and following completion of installation. Test and inspection results are summarized below. Detailed documentation of the inspection and testing performed is included in the Appendix of this report.

Leak Testing

Prior to being placed in service the completed replacement tank was hydrostatically tested by filling it to above its normal maximum operating level with clean water and observing all joints, connections, and components for evidence of leakage, distortion, or other problems. No evidence of leakage or other problems was observed.

The new section of pipe which was installed to connect the replacement tank to the existing piping system was hydrostatically tested at 1.5 times its design pressure in accordance with ASME/ANSI B31.3 requirements after fabrication and was also leak tested at operating pressure following installation. Both tests were satisfactory with no evidence of leakage.

INSTALLATION ASSESSMENT (Continued)

Visual Inspection

Following completion of installation the replacement tank, new piping spool, and other ancillary equipment were visually inspected to verify their compliance with the design drawings and applicable specifications and requirements, and for evidence of weld breaks, punctures, scrapes of protective coatings, cracks, corrosion, or other structural damage or incomplete or inadequate construction or installation. No deviations from the design documentation or construction or installation deficiencies were observed.

Ultrasonic Thickness Measurements

The wall thickness of the new pipe spool and the tank floors, shell, roof, and nozzles were measured with an ultrasonic thickness gage to confirm compliance with design specifications and standards. All component thicknesses were found to meet or exceed design requirements.

UNDERGROUND COMPONENTS (LAC 33:V.1905 C)

The replacement WWCB Well Injection Tank and connecting pipe spool are located aboveground and do not include any underground components.

TIGHTNESS TESTING (LAC 33:V.1905 D)

As was described above, the replacement tank and connecting pipe spool were leak tested before being placed in service. The tank system components were found to be tight.

ANCILLARY EQUIPMENT (LAC 33:V.1905 E)

New ancillary equipment for the replacement tank includes the pipe spool connecting the new tank to the existing piping system and a new emergency pressure and vacuum relief valve located on a nozzle on the tank roof. Both of these ancillary equipment items are bolted directly to the tank which is located inside an existing secondary containment area with reinforced concrete walls. Their location within the secondary containment dike provides protection from physical damage. Their attachment to the tank meets the applicable support requirements of ASME/ANSI B31.3 and will provide satisfactory protection from excessive stress due to settlement, vibration, expansion, or contraction.

CORROSION PROTECTION (LAC 33:V.1905 F)

The replacement tank is constructed of type 304L stainless steel. The new connecting pipe spool is constructed of type 316L stainless steel. These materials were selected for their compatibility with and resistance to corrosion from the wastes being handled. Analytical data for Waste Water Column Bottoms (WWCB) material (EPA Waste Code K011) is included in the Appendix of this report. Past experience at this facility with these materials has demonstrated their suitability for this service. The new tank system components will not be in contact with soil or groundwater. Therefore, cathodic protection or other additional corrosion protection measures are not required.

CONCLUSIONS OF ASSESSMENT

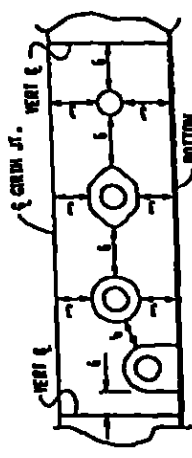
The assessments and inspections performed and the information presented above and included in the Appendix of this report confirm that the replacement WWCB Well Injection Tank

CONCLUSIONS OF ASSESSMENT (Continued)

(TA-402) at the Cytex Industries Fortier Plant in Waggaman, Louisiana has been installed in accordance with the system design documentation and applicable specifications. Inspections and testing for inadequate construction, damage, and tightness revealed no leaks or significant defects in the replacement tank or other new system components. The installation therefore satisfies the requirements of 40 CFR 264.192 (b-f), and the corresponding State of Louisiana requirements in LAC 33:V.1905 (B-F).

97-2025M03

ILLUSTRATIONS

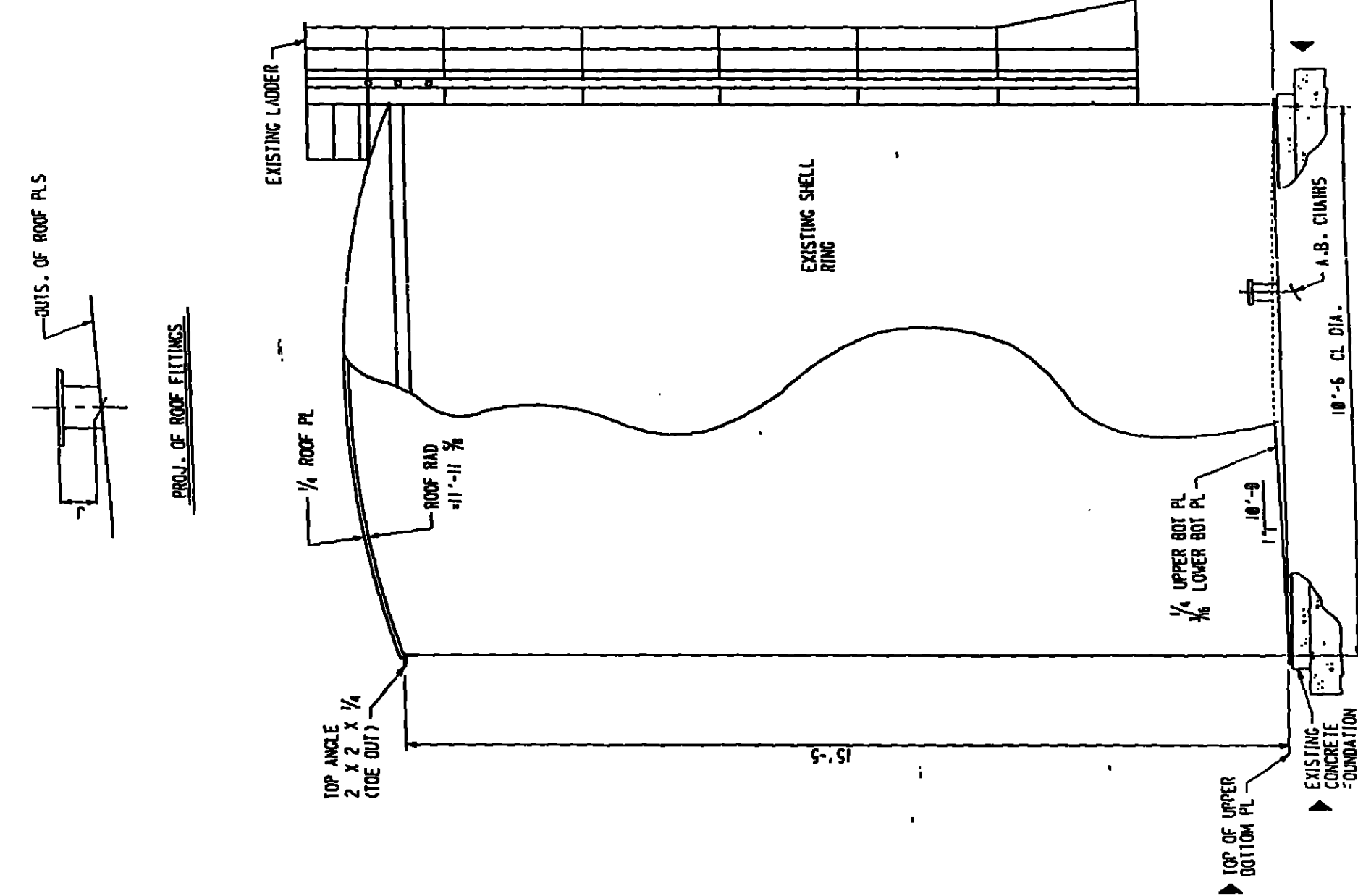


FOUNDATION --- EXISTING CONCRETE SLAB
CONSTRUCTION --- BY CBI MACON
SERVICE --- WATER INJECTION (S.G. = 1.0)
CAPACITY --- 9986 GALLONS (NORMAL)
SPECIFICATIONS --- API 650 APP. 5 (NON-CERTIFIED DUE TO EXISTING SHELL)
DESIGN METAL TEMPERATURE --- 30°F
DESIGN WIND VELOCITY --- 110 MPH PER API 650
ROOF LOAD --- 25.0 PSF
SEISMIC --- NONE
MATERIAL SPEC --- PLATES --- A240 304 (ROOF & BOTTOM)

CORROSION ALLOWANCE --- NONE
INSPECTION - MILL - CTR
SHOP - CBI
FIELD - CBI & CUSTOMER
SURFACE
PREPARATION --- NONE
PAINTING --- NONE
WELD EXAM. --- PER API 650, API 653

FITTINGS — TO BE LOCATED AS SHOWN ON ORIENTATION DRAWINGS(5). IF FITTING LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH ABOVE. DIMENSIONS GIVEN ARE 10E-TO-10E OF FILLET WELDS OR 10E-TO-CL OF BUTT WELDS. FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES. FLANGE BOLT HOLES TO STRADDLE 0° - 180° CENTERLINE FOR ROOF NOZZLES.

TEST — DURING WATER TEST DO NOT FILL TANK ABOVE MAXIMUM HEIGHT OF 15'-7" OVER FILLING MAY CAUSE DAMAGE.

[illegible]

► **WORLDWIDE PLANT | 19800 5TH AVENUE, SUITE 100, DENVER, CO 80202**

GENERAL ELEVATION

97-2025M03

APPENDIX
Inspection Documentation

APPENDIX
Inspection Documentation

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
CBI Na-Con Letter of Acceptance (4-14-97)	A-1
CBI API 653 NDE Checklist Contract 962081 (11/20/96)	A-2
CBI Final Inspection List for Flat Bottom Tanks (11/20/96)	A-6
Owensby & Kritikos, Inc. RT Report - RT 31176 (12/20/96)	A-7
Linder New Tank Inspection Record (5/5/97)	A-8
Linder Hydrostatic Test Record (4/24/97)	A-10
Linder Pre-Service Leak Test Record (5/5/97)	A-11
Linder Thickness Measurement Record (5/5/97)	A-12
Linder Thickness Measurement Record (5/12/97)	A-14
Cytec Injected Waste Analysis (2/12/97 Memo with attachments)	A-15



A-1

LETTER OF ACCEPTANCE

Na-Con Contract No. 962081 Item or Tank No. TA-402
Customer Cytec
Location Westwego, La. Customer Order No. _____
Description 10'6" Ø x 15'5" SS Dome Roof Tank.

ACCEPTANCE:

This is to certify that work described above has been completed with following exceptions*

1. Hydrotest of tank
2. Weld spot pipe to table on top of tank
3. Mannway bolt-up

In accordance with the contract, and is accepted, subject to the continuing obligation of Na-Con Services, Inc. under Contract Guaranty, if any.

By John Rudel Date 1/27/97
Customer's Representative

Title PROCESS ENGINEER

Final Test Date LATER

Bob Miller
Na-Con Representative

- * If any exceptions apply, this will constitute a Conditional Acceptance. When water is not available upon completion of construction, the owner shall give adequate notice to Na-Con at the following address when testing will be performed. Na-Con can then arrange to have a representative witness the test.

Hydrotest Completed 4-14-97
John Rudel 13'6"
4/14/97
15'7"

- CAUTION: 1 Do not fill above maximum liquid height, which is 15'7". Over filling can cause damage.
2 The tank must be properly vented to compensate for filling, draining, and atmospheric changes.
3 Tank should be drained in such a manner as to prevent damage to foundations and other facilities.

Orig. to Na-Con Construction Office
cc: — Customer
Na-Con Sales

Printed in USA

NAC 13 REV AUG 85

FIELD INSPECTION REQUIREMENTS AND INSPECTION AND TESTING SEQUENCE FOR TANK COMPONENTS		Foreman, Welding Supervisor Welding Foreman	
		Initials	Date
> A Bottom Welds - Replacement Bottom			
>			
> 2 Visually inspect completed replacement.		KMR	12-24-96
3 Vacuum box at 2 psig (4.1" Hg) (13.8 kPa gauge) to 4 psig (8.2" Hg) (27.6 kPa gauge). Air tested		Shop	
> 4 Prior to hydrotest and after completed corner weld, solution film test upper and lower bottom welds to shim plates at 2" (50.8 mm) water column. Shop in stalled			
> 5 Record welders I.D. on replacement bottom joints. Shop welded		KMR	12-24-96
> Except corner weld Field			
7 Prior to final tank closure, visually inspect entire bottom including areas of obstruction such as columns, internal piping and bottom attachments. Vacuum box test any susoicious areas.		KMR	12-24-96
>			
>			
>			
> C2 Double Butt Welded Bottom (when first shell course is Group I-IIIA material)			
> 1 After fit-up and before welding, check joint gap between sketches. N/A Shop			
> 2 Visually inspect completed welds.			
D Corner Welds - Replacement bottoms, Annular Rings or Shell or Repair Welds			
> 1 For new welding, oil penetrant leak test the first weld pass of the first fillet weld by applying a light-diesel oil and periodically observing during a minimum four (4) hour time period. In addition, liquid penetrant test the corner weld per Customer Specification ES6102, Paragraph 18.5. PTD		KMR	12-23-96
> 2 Visually inspect completed inside and outside welds.		KMR	12-24-96
>			
>			
5 For replacements, record welders I.D. at corner joints or on a sketch of the bottom joints.		KMR	12-24-96
>			
>			
E Shell - Butt Welds of Verts and Horizontal Joints and Joints of Circular, Square and Rectangular Replacement Plates and Doorsheets			
1 Visually inspect completed welds.		KMR	12-24-96
>			
>			
4 Radiograph as required (see NDE 3 foreman's examination instructions).		KMR	12-24-96
5 Visually inspect cavities resulting from gouging or grinding operations to remove weld defects.		KMR	12-24-96
> 6 Liquid penetrant examine cavities resulting from gouging or grinding operations to remove weld defects.		KMR	12-24-96
7 Radiograph the full length of completed repairs.		KMR	12-24-96
8 Record welders I.D. on repaired areas or on a drawing or repair areas.		KMR	12-24-96
9 Record location of shell repairs, replacement plates, doorsheets or modifications on a record drawing.		KMR	12-24-96
>			
11 When hydrostatic testing is required for other than Appendix F Design Tanks - Water test to design liquid height and inspect for leaks.		By Customer	

R	By	1	CSG	Const. Assigned	Eng. Assigned	Made By	Date	Chkd By	Date	Contract No.	Sheet
E	Chkd	1	GBM								NDE
V	Date	11-25-96		NSS	PPH/GBM	GMG	11/14/96	CCSG	11/20/96	962081	1

FIELD INSPECTION REQUIREMENTS AND INSPECTION AND TESTING SEQUENCE FOR TANK COMPONENTS		Foreman, Welding Supervisor Welding Foreman	
		Initials	Date
F Shell Plates - Attachments			
1	Visually inspect welds joining permanent attachments to shell plates prior to hydrotest.	KMR	12-24-96
>			
>			
>			
5	Visually inspect cavities resulting from gouging or grinding to remove attachment welds of existing reinforcement pad plates.	KMR	12-24-96
>	6 Liquid penetrant examine cavities resulting from gouging or grinding to remove attachment welds of existing reinforcing pad plates.	KMR	12-24-96
7	Ultrasonic examine areas of shell plates for laminations in the immediate area affected when adding a reinforcing pad plate to an existing unreinforced penetration or when making a hot tap connection.		
G Replacement Fittings Penetrating The Tank Shell (Field Welds)			
1	Visually inspect attachment welds on all new or replacement fittings penetrating the tank shell including fillet welds attaching reinforcing plates to the tank and the inside surfaces of welds between the fitting neck, the tank shell and reinforcing plate.	KMR	12-24-96
>	2 Liquid penetrant examine attachment welds on all new or replacement fittings penetrating the tank shell including fillet welds attaching reinforcing plates to the tank and the inside surfaces of welds between the fitting neck, the tank shell and reinforcing plate.	KMR	12-24-96
>			
4	Air pressure solution film test reinforcing pad plate and neck to shell welds at 10 to 15 psig (69 to 103.4 kPa gauge) max.	KMR	12-24-96
>			
>			
>			
>			
>			
>			
>			
>			

WHEN COMPLETE

FOREMAN

Send Construction Office
One Legible and Work Copies If Any

GENERAL NOTES (When Applicable):

Liquid penetrant may be substituted for magnetic particle only when an area to be examined is inaccessible for the magnetic particle equipment or when stipulated by Engineering-Assigned because it was specified in the contract by the Purchaser.

For postweld heat treated vessels or parts, cracks sometimes develop during PWHT, so magnetic particle examinations as specified must be performed after PWHT.

The cost of repeating PWHT in the field is very high; therefore, the additional examination before PWHT is mandatory for field PWHT vessels or parts.

For A-517 and A-514 steels, wait a minimum of 24 hours after welding, or hold a 200F to 300F (93C to 149C) preheat for two hours and cool to ambient before performing a magnetic particle examination. After postweld heat treatment, allow the vessel to cool to ambient before performing the examination. Cracking often occurs during and just after cooling.

R	By		Const. Assigned	Eng. Assigned	Made By	Date	Chkd By	Date	Contract No.	Sheet
E	Chkd									NDE
V	Date		NSS	PPH/GBM	GMG	11/14/96	C86	11-20-96	962081	2

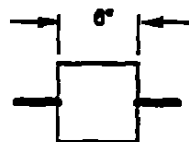
**API 653 TANK INSPECTION, REPAIR, ALTERATION
AND RECONSTRUCTION OF API 650 TANKS
FOREMAN'S INSTRUCTIONS
RADIOGRAPHY EXAMINATION REQUIREMENTS**

1.0 Joint Thickness: Joints shall be considered to be of the same thickness when the difference in the specified or design thickness does not exceed 1/8" (3.2mm).

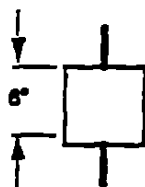
1.1 Application: This instruction is for the radiography examination of weld joints of new material to existing material and/or repaired weld joints.

1.2 If two welders weld opposite sides of the same butt joint, the work of both may be examined with one spot radiograph examination.

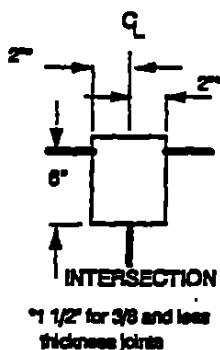
1.3 Spot radiographs shall clearly show a minimum of 6" (152mm) of weld length. At intersections, radiographs must show 2" (50mm) (1 1/2" (38mm) for 3/8" (9.5mm) and less thickness joints) of girth weld on each side of the vertical weld plus 6" (152mm) of vertical weld.



SPOT



SPOT

INTERSECTION
1 1/2" for 3/8 and less
thickness joints

1.4 Horizontal Joints: One spot in first 10' (3.05m) of each joint type and thickness (based on the thickness of the thinner plate at the joint) without regard to the number of welders. Thereafter, one spot in each additional 50' (15.24m) and any remaining major fraction thereof over 25' (7.6m).

1.5 Vertical joints for shell plates up to and including 1" (25.4mm) thick: One spot at random in each vertical joint.

1.6 Vertical joints, for shell plates over 3/8" (9.5mm) and up to and including 1" (25.4mm): Two spots in each vertical joint of the first course, one of which shall be as close to the bottom as practicable, the other taken at random. The other spot radiographs specified in the preceding paragraph can be used to satisfy this requirement.

1.7 Vertical joints, for shell plates over 1" (25.4mm) and up to and including 1 3/4" (44.5mm):

All 100% radiographed

1.8 Radiograph all intersections for which one or both welds are new or repaired.

1.9 For circular new or replacement insert plate weld joints, a minimum of one spot radiograph regardless of thickness.

1.10 For square or rectangular new or replacement insert plate or door sheet weld joints, one spot radiograph in a horizontal joint, one spot radiograph in a vertical joint and one spot radiograph in each corner for joints up to and including 1" (25.4mm) thick. For vertical joints over 1" (25.4mm) thick, follow the rules of item 1.7.

1.11 Radiograph all junctions between repair and existing welds.

1.12 Radiograph the full length of completed repairs of all butt welds.

1.13 Adjust and record on the radiography examination schedule and stretch-out drawing, the number and location of radiographs taken based on the actual number of welders working (see 1.2).

Insofar as possible, an equal number of spot radiographs shall be taken from the work of each welder, except in the case where the length of joint welded by a welder is much less than average.

R	By		Const. Assigned	Eng. Assigned	Made By	Date	Chkd By	Date	Contract No.	Sheet
E	Chkd									NDE
V	Date		NSS	PPH/GBM	GMG	11/14/96	<i>CBE</i>	11-20-96	962081	3

**API 653 TANK INSPECTION, REPAIR, ALTERATION AND RECONSTRUCTION
FOR API 650 CERTIFIED AND NON-CERTIFIED TANKS**

HYDROSTATIC TEST INSTRUCTIONS (When Required) OPEN TOP TANKS (WITH OR WITHOUT FLOATING ROOFS) OPEN FIXED ROOF TANKS NOT DESIGNED TO APPENDIX F		Foreman, Welding Supervisor	
		Welding Foreman	
		Initials	Date
PRELIMINARY			
1 Be sure grout is in place (541-1-1). Tighten anchor bolts snug and uniform.			
NEVER CLOSE (BUTTON-UP) A TANK, FOR ANY LENGTH OF TIME, WITHOUT ADEQUATE VENTING			
HYDROSTATIC TEST			
2 Make certain roof manhole and/or other roof fittings having as large an area as the water inlet are open before filling tank with water.			
3 Before, during and after filling the tank with water, check the elevations around the bottom and immediately report any differential or excessive settlement to the local construction office. All elevations should be referenced to a temporary retrievable bench mark.			
4 With the manhole and/or other roof fittings open, slowly fill the tank with water to the design liquid height shown on the general plan drawing.			
5 Retighten anchor bolts. Inspect the shell, including fittings and lower piping for leaks and signs of distress. If any leaks appear, lower the water level to below the leak, make repairs and retest.			
6 Hold test water height until the inspector is satisfied, but must hold at least twenty four (24) hours.			
7 Open roof manhole and/or other roof fittings having as large an area as the water outlet, and drain all water from the tank.			
8 When empty, recheck anchor bolts.			
9 Reference Customer Specification ES-6501, Issue No. 1, for additional hydrostatic testing.			

• These operations may be regulated by the Purchaser's schedule

Hydro by Cytec

WHEN COMPLETE
FOREMAN
Send Construction Office One Legible and Work Copies If Any

R	By		Const. Assigned	Eng. Assigned	Made By	Date	Chkd By	Date	Contract No.	Sheet
E	Chkd									NDE
V	Date		NSS	PPH/GBM	GMG	11/14/96	<i>CBG</i>	11-20-96	962081	4



FINAL INSPECTION LIST FOR FLAT BOTTOM TANKS

A-6

Contract No. 962081 Foreman Bob Allen Location Cytex - Westwego, LA.

Description 10'-6" Ø X 15'-5" High DRT Tank No. TA-402 Date 11/20/96

	YES	NO	
1			Type foundation? <u>Concrete Ringwall</u>
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Was the foundation checked and charted for level? <u>HAD TO pour concrete in ON TOP OF their FOUNDATION.</u>
3	<input type="checkbox"/>	<input type="checkbox"/>	If concrete foundation, were shims used as required? <u>CUSTOMER SET TANK.</u>
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does correct amount of plate extend outside corner weld? <u>(WE BUILT ON LEVEL BLOCKS)</u>
5	<input type="checkbox"/>	<input type="checkbox"/>	Were bottom laps properly prepared prior to welding?
6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Were drain holes welded and tested?
7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shell free of buckles and pointed vents?
8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	All shell plates aligned within limits?
9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Top angle plumb?
10	<input type="checkbox"/>	<input type="checkbox"/>	Are columns plumb and base clips welded?
11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are all welds proper sized and good appearance?
12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are welds free of undercut per code requirements?
13	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stairway properly installed and handrail ground smooth? <u>STRAIGHT LATTER</u>
14	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Were burrs chipped flush inside; ground flush outside?
15	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Were shell fittings properly installed and inside ground to proper radius?
16	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does roof have good appearance?
17	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Were shell fittings solution film tested?
18	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Were plugs or radiographs taken per code requirements?
19	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Were tracers taken per code requirements? <u>NOT REQUIRED</u>
20	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Were weld repairs properly made and reexamined?
21	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Slag, weld splatter, and arc strikes removed?
22	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Was NDE checklist completed and sent in per Std. 750-17
23			Total number of radiographs <u>11</u> Number bad <u>1</u> Defect in center of Film NO TRACER NEEDED

Remarks: Everything went good
Like Hydro Test Customer is doing this

Copies: Original - Construction Office
 1 Welding Supervisor
 1 Foreman
 1 Houston Corporate Welding

SIGNED

Date



Owensby & Kritikos, Inc.

RT 31176-A-7

NEW ORLEANS DIVISION
671 Whitney Ave., Bldg. B
Gretna, La 70056
Telephone 504/388-3122
Fax 504/362-4546

LAFAYETTE DIVISION
111 Lafferty Drive
Lafferty Industrial Park
Broussard, La 70518
Telephone 318/837-9721
Fax 318/837-1318

LAKE CHARLES DIVISION
2850 South Beggs Parkway
Sulphur, La 70663
Telephone 318/527-8812
Fax 318/527-0078

Page 1 of 1

P.O. Box 41146

Houston, Texas 77241-1446

DATE 12/20/96

CUSTOMER Chicago Bridge + Iron LOCATION Cy-TEC Fortier-Pla.

CONTACT Perform RIT ON 2 tanks (TA-204-3B + TA-402)

CONTRACTOR - SAME - JOB NO. 105606.42

CUSTOMER ORDER NO. P.O. # H 41131 SPECIFICATION ASME Sec. 8

RADIOGRAPH NUMBER	SIZE		WELDED BY	LOCATION	ACCEPT	REJECT	REMARKS	RADIOGRAPHIC TERMS
	PLATE	PIPE						
Contract # 962052 - Monel 190 TA 204-3B								A.S. = ARC BURN B.T. = BURN THROUGH C.S. = CONCAVE BEAD C. = CRACK E.C. = EXCESSIVE CAP E.P. = EXCESSIVE PENETRATION F.A. = FILM ARTIFACT G.P. = GAS POCKET H.B. = HOLLOW BEAD I.P. = INADEQUATE PENETRATION I.F. = INCOMPLETE FUSION I.U. = INTERNAL UNDERCUT L.C. = LOW CAP O.U. = OUTSIDE UNDERCUT P.P. = PIPING POROSITY P. = POROSITY S.B. = SUCK BACK S.I. = SLAG INCLUSIONS S.L. = SLAG LINES
N-1	5/16"	—	WDM RTM	1-2	✓			
Contract # 962081 S/S TA-402								
1	5/16"	—	WDM RTM	1-2	✓			
2		—		1-2	✓			
N-3		—		1-2	✓			
N-4		—		1-2	✓			
N-5		—		1-2	✓			
N-6		—		1-2	✓			
N-7		—		1-2	✓			
N-8		—		1-2	✓			
N-9		—		1-2	✓			
N-10		—		1-2	✓	Por.		
N-11		—		1-2	✓			
N-10R	5/16"	—	WDM RTM	1-2	✓	Por.		
N-10R	5/16"	—	WDM RTM	1-2	✓			
Labor - 296.00								
Mileage - 16.50								
Film - 90.00								
- Source Charge - 0								

HOURS WORKED	
7	Straight Time
	Overtime
1	Travel Time
MILEAGE	
30	Miles Traveled
C-629	Vehicle #
SUBSTANCE	
—	
FILM	
15	5x7
—	AGFA D4
SOURCE OF CHARGE	
✓	Ir
—	Co
MISC. CHARGES	
—	
—	

LABOR - 296.00

Mileage - 16.50

Film - 90.00

Source Charge - 0

Jaime Marin
RADIOGRAPHER
Lennel Capdeville
ASST. RADIOGRAPHER

✓ LEVEL II

Total Cost \$ 402.50

Bob Allen

CLIENT



A-8

NEW TANK INSPECTION RECORD

CLIENT:	Cytec Industries Inc.	Sheet:	1 of 2
PLANT LOCATION:	Waggaman, LA	Job No.:	97-2025M03
INSPECTION TYPE:	External	Date:	May 5, 1997
ITEM NO.:	TA-402	By:	THW
SERVICE:	WWCB Well Injection Tank		
SIZE / CAPACITY:	10'-6" dia x 15'-5" / 10,000 gal	TANK TYPE:	Vertical flat double bottom dome roof
OPER. PRESS./TEMP.:	Atmos. / 200 F max.		

	<u>ROOF</u>	<u>SHELL</u>	<u>FLOOR</u>
MATERIALS:	Type 304L SS	Type 304L SS	Type 304L SS
ROOF CONDITION:		Satisfactory	
SHELL CONDITION:		Satisfactory	
FLOOR CONDITION:		Visible portions satisfactory	
WELDED JOINT CONDITION:		Satisfactory	
SUPPORT TYPE:		Reinforced concrete pad	
FOUNDATION CONDITION:		Satisfactory	
ANCHORAGE PROVISIONS:		Four chairs with 1" dia. anchor bolts	
INTERNAL STRUCTURE CONDITION:		Not observed	
NOZZLE CONDITION:		Satisfactory	
EXTERNAL COATING:		None	
INTERNAL LINING:		None	
PRESSURE VENT PROVISIONS:		6" normal conservation vent on scrubber / 16" emergency	
VACUUM VENT PROVISIONS:		6" normal conservation vent on scrubber / 16" emergency	
SIGNS OF CRACKS:		None	
SIGNS OF PUNCTURES:		None	
SIGNS OF COATING DAMAGE:		Not applicable	
SIGNS OF CRACKS/MATERIAL DAMAGE:		None	
SIGNS OF CORROSION:		None	
OTHER STRUCTURAL DAMAGE OR PROBLEMS:		None observed	

COMMENTS: Tank visually in good condition. Arrangement per CBI drawings. Nameplate data: Horton Tank;
Contract 962081 1996; 10'-6" dia. X 15'-5" High Dome Roof; CBI Na-Con, Inc. Oak Brook, IL



A-9

NEW TANK INSPECTION RECORD

CLIENT:	Cytec Industries Inc.	Sheet:	2 of 2
PLANT LOCATION:	Waggaman, LA	Job No.:	97-2025M03
INSPECTION TYPE:	External	Date:	May 5, 1997
ITEM NO.:	TA-402	By:	THW
SERVICE:	WWCB Well Injection Tank		
	CODE: API 650		

COMMENTS: Tank is stainless steel replacement for similar sized rubber lined carbon steel tank previously in same service at same location. Tank located on modified existing reinforced concrete support pad located inside concrete secondary containment area. Tank provided with four anchor bolts. Previously existing vent scrubber and pressure/vacuum conservation valve installed on replacement tank. New 16 inch diameter emergency pressure/vacuum vent installed on roof nozzle. Emergency P/V vent Tag: 2468A nameplate data: Protectoseal Model AXF51S16; Size 16; Opening Vac: 0.75 oz/si; Opening Press: 6 WC". New 3 inch spool piece connecting tank to existing inlet/discharge piping installed at time of inspection, but tank valve closed and tank not in service. Tank still full of water from hydrotest at time of inspection. No evidence of leakage or other problems.



HYDROSTATIC TEST RECORD

CLIENT: Cytec Industries Inc.

LOCATION: Waggaman, LA

PIPING DESCRIPTION: WWCB Well Injection Tank (TA-402) Suction / Discharge Spool

REFERENCE DRAWING: Project Services Iso for W.O. 423276

PIPE SIZE: 3 NPS

PIPE MATERIAL: Schedule 40S Type 316L Stainless Steel

DESIGN PRES/TEMP: 150 lb. Class / 200 F

OPER. PRES/TEMP: less than 90 psig / 140 F

TEST PRES/TEMP: 228 psig

TEST FLUID: Water

GAGE TYPE/RANGE: Dial / 0-400 psig

GAGE CALLIBRATION: IMC 8-26-96

DURATION OF TEST: Witnessed 10+ minutes

WITNESSED BY: T.H. Wimbrow

DATE: 4/24/97

TEST SATISFACTORY: Yes

COMMENTS: Short (approx. 2 ft. total length) spool to connect replacement WWCB Well Injection Tank to existing piping system. Spool has two weld neck flanges and is constructed of schedule 40S type 316L stainless steel.



PRE-SERVICE LEAK TEST RECORD

CLIENT: Cytec Industries Inc.

LOCATION: Waggaman, LA

PIPING DESCRIPTION: Replacement WWCB Well Injection Tank (TA-402) and new inlet/discharge spool connecting tank to existing piping

REFERENCE DRAWING: Cytec Project Services Iso for W.O. 423276

LEAK TEST PRESSURE: Pipe spool operating, tank full of water

TEST FLUID: Pipe: injection water
Tank: demineralized water

DURATION OF TEST: Observed 30+ minutes

WITNESSED BY: T.H. Wimbrow

DATE: 5/5/97

TEST SATISFACTORY: Yes

COMMENTS: Tank and new connecting spool observed for evidence of leakage prior to being placed in service. No leakage or other problems observed. Inlet/discharge spool connected, tank block valve closed.



ULTRASONIC THICKNESS MEASUREMENT RECORD

Client: Cytec Industries Inc.
Location: Waggaman, Louisiana
Item: Replacement WWCB Well Injection Tank
 TA-402
Code: API 650 Appendix S; API 653

Page: 1 of 2
Job No.: 97-2025M03
Date: 05-May-97
By: THW

Comments: Tank constructed of type 304L stainless steel; ladder located at south.
 Measurements taken with Panametrics Model 26 DL Plus ultrasonic thickness meter
 calibrated with stainless steel step block S/N A12816. Measurements are in inches.
 "Nom. Thick." = Nominal design thickness
 "Min. Nom." = Minimum nominal thickness less manufacturing tolerance per Code
 N/A = Not Accessible

Tank Thickness Measurements

Location	Nom. Thick.	Min. Nom.	Position			
			N	E	S	W
Low shell course - low	0.313	0.273	0.331	0.320	0.320	0.331
Low shell course - mid	0.313	0.273	0.333	0.316	0.320	0.334
Low shell course - high	0.313	0.273	0.325	0.313	0.318	0.329
Mid shell course - low	0.313	0.273	0.322	0.316	0.310	0.325
Mid shell course - mid	0.313	0.273	N/A	N/A	0.315	N/A
Mid shell course - high	0.313	0.273	N/A	N/A	0.316	0.329
Top shell course - low	0.313	0.273	N/A	N/A	0.323	0.316
Top shell course - high	0.313	0.273	N/A	N/A	0.328	0.324
Shell top angle	0.25	0.219	N/A	N/A	0.240	0.247
Roof - outer edge	0.25	0.219	0.247	0.243	0.244	0.246
Roof - center	0.25	0.219	0.245		0.246	
Primary floor - outer edge	0.25	0.219	0.244	0.246	0.244	0.246
Secondary floor - outer edge	0.188	0.164	0.181	0.181	0.181	0.182



ULTRASONIC THICKNESS MEASUREMENT RECORD

Client: Cytec Industries Inc. **Page:** 2 of 2
Location: Waggaman, Louisiana **Job No.:** 97-2025M03
Item: Replacement WWCB Well Injection Tank TA-402 **Date:** 05-May-97
Code: ASME/ANSI B31.3; ANSI B36.19; ASTM A530 **By:** THW

Comments: Tank and nozzles constructed of type 304L stainless steel; ladder located at south.
 Reference CBI drawings contract no. 962081
 Measurements taken with Panametrics Model 26 DL Plus ultrasonic thickness meter
 calibrated with stainless steel step block S/N A12816. Measurements are in inches.
 "Nom. Thick." = Nominal design thickness; N/A = Not Accessible
 "Min. Nom." = Minimum nominal thickness less manufacturing tolerance per Code

Nozzle / Misc. Thicknesses

Location	Size NPS	Sch.	Nom. Thick.	Min. Nom.	Measured Thickness
Emergency water inlet, south	3	40s	0.216	0.189	0.200
Emergency water inlet, repad			0.375	0.328	0.385
Interstitial inlet; SSW	1-1/2	3000#			0.389
Shell manway; repad			0.375	0.328	0.378
Shell manway; nozzle	24		0.500	0.438	0.512
Shell manway; flange			0.563	0.492	0.563
Shell manway; cover			0.438	0.383	0.448
Interstitial outlet; NNE	1-1/2	3000#			0.396
Spare w/ valve & blind; repad			0.375	0.328	0.387
Spare w/ valve & blind; nozzle	4	40s	0.237	0.207	0.213
Spare w/ blind; repad			0.375	0.328	0.388
Spare w/ blind; nozzle	3	40s	0.216	0.189	0.201
Inlet / Outlet; repad			0.375	0.328	0.385
Inlet / Outlet; nozzle	3	40s	0.216	0.189	0.199
Anchor chair; top plate			0.500	0.438	0.517
Anchor chair; side plate			0.500	0.438	0.513
Anchor bolt; diameter			1.000		0.930
Roof LG nozzle	3	40s	0.216	0.189	0.203
Roof emergency vent; nozzle	16				0.340
Roof emergency vent; flange	16	150#			1.480
Roof scrubber water inlet	4	40s	0.237	0.207	0.213
Scrubber mount; repad			0.375	0.328	0.380
Scrubber mount; "nozzle"			0.250	0.219	0.243
Scrubber mount; top plate			0.500	0.438	0.509
Roof spare nozzle; blinded	3	40s	0.216	0.189	0.194
Roof spare nozzle; blinded	2	40s	0.154	0.135	0.140
Roof spare nozzle; blinded	3	40s	0.216	0.189	N/A



ULTRASONIC THICKNESS MEASUREMENT RECORD

Client: Cytec Industries Inc. **Page:** 1 of 1
Location: Waggaman, Louisiana **Job No.:** 97-2025M03
Item: Replacement WWCB Well Injection Tank TA-402 **Date:** 12-May-97
Code: ASME/ANSI B31.3; ANSI B36.19; ASTM A530 **By:** THW

Comments: New tank inlet/outlet spool constructed of Schedule 40S Type 316L stainless steel
Measurements taken with Panametrics Model 26 DL Plus ultrasonic thickness meter
calibrated with stainless steel step block S/N A12816. Measurements are in inches.
"Nom. Thick." = Nominal design thickness; N/A = Not Accessible
"Min. Nom." = Minimum nominal thickness less manufacturing tolerance per Code

Tank Inlet/Outlet Piping Thickness

Location	Size NPS	Sch.	Nom. Thick.	Min. Nom.	Measured Thickness
Pump end elbow	3	40s	0.216	0.189	0.194
Straight pipe	3	40s	0.216	0.189	0.205
Elbow	3	40s	0.216	0.189	0.194
Straight pipe - pump end	3	40s	0.216	0.189	0.203
Straight pipe - tank end	3	40s	0.216	0.189	0.204

CYTEC

To: Vincent Diaz

Date: February 12, 1997

Location: Fortier

Copy to: F. Whiteley

From: Guy C.A. Rich

J. Schmeier

A. Junker

Location: Fortier

J. Meyer

S. Eccel

P. Savoy

Subject: Injected Waste Analysis.

Reference: Rm. 9 (G. Rich) PC C:\TC4\WTUV9612\DWMA9612.SEQ Lines 7-12. C:\TC4\WTUV9612\DWAM9612.SEQ Lines 14-25. C:\TC4\WTCD9612\MMEX9612.SEQ Lines 58-68, NB 1231 pp. 67-68; Rm. 4 (J. Meyer) NB 1237 pp. 9-14. Chrom Perfect Sequence DW020397.SEQ Entries 1-42; Rm. 13 (C.J. Wusnack) GC/MS Log 02/03/97-02/04/97.

File Name: C:\6WINWORD\ENV\DW1Q97.DOC

Contributors: C. J. Wusnack, J. Meyer.

SAMPLE HISTORY

Comprehensive knowledge of the character and composition of these materials is necessary for environmental and tax purposes prior to deep well injection.

SAMPLE DESCRIPTION

Analysis was performed on composites of samples collected on January 21, 22, and 23, 1997.

Benzene and toluene in general accordance with SW-846-8240.

Acetone, acrylonitrile, acetonitrile, propionitrile, methanol, methyl methacrylate (MMA), fumaronitrile, succinonitrile, and pyridine in general accordance with SW-846-8000.

Acrylamide and acrylic acid by SW-846-8310

Acetic acid, formic acid, and methacrylic acid by HPLC.

RESULTS - Waste Acid Analysis

Sample Location: Maturing Tank

2/12/97

Analyte	Method	Analyst	Sampling Date	Analysis Date	Detection Limit. ppm	Concentration ppm w/w
Acetone	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	440
Methanol	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	5700
MMA	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	380
Toluene	SW-846-8420	CJW	1/21-23/97	2/3-4/97	<0.032	BDL
Methacrylic acid	HPLC	GAR	1/21-23/97	1/31/97	<10	2030
Benzene	SW-846-8420	CJW	1/21-23/97	2/3-4/97	<0.032	BDL

RESULTS - Waste Water Analysis

Sample Location: AN Waste Disposal. Waste Water Tank

Analyte	Method	Analyst	Sampling Date	Analysis Date	Detection Limit. ppm	Concentration ppm w/w
Acetone	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
Acrylamide	SW -846-8310	GAR	1/21-23/97	2/3-4/97	<1	1040
Acrylic Acid	SW -846-8310	GAR	1/21-23/97	2/3-6/97	<1	5500
Acrylonitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	26
Acetonitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	770
Propionitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	48
Methanol	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
MMA	SW -846-8000	JEM	1/21-23/97	2/3-4/97	<10	BDL
Toluene	SW-846-8420	CJW	1/21-23/97	2/3-4/97	<0.044	BDL
Formic Acid	HPLC	GAR	1/21-23/97	1/31/97	<10	790
Acetic Acid	HPLC	GAR	1/21-23/97	1/31/97	<10	1310
Fumaronitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	1010
Succinonitrile	SW -846-8000	JEM	1/21-23/97	2/3-4/97	<50	84
Benzene	SW-846-8420	CJW	1/21-23/97	2/3-4/97	<0.044	BDL
Pyridine	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	220

RESULTS - Tank 500 (MET) Analysis
Sample Location: (T-500 Tank)

A-17

2/12/97

Analyte	Method	Analyst	Sampling Date	Analysis Date	Detection Limit, ppm	Concentration ppm w/w
Acetone	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	250
Acrylamide	SW -846-8310	GAR	1/21-23/97	2/3/97	<1	196
Acrylic Acid	SW -846-8310	GAR	1/21-23/97	2/3/97	<1	270
Acrylonitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
Acetonitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	3540
Propionitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	45
Methanol	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	360
MMA	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	30
Toluene	SW-846-8420	CJW	1/21-23/97	2/3-4/97	<0.050	7.2
Formic Acid	HPLC	GAR	1/21-23/97	1/31/97	<10	96
Acetic Acid	HPLC	GAR	1/21-23/97	1/31/97	<10	320
Fumaronitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
Succinonitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<50	1010
Benzene	SW-846-8420	CJW	1/21-23/97	2/3-4/97	<0.048	BDL
Pyrrolidine	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL

RESULTS - Recovery Column Bottoms (RCB) Analysis
Sample Location: AN Purification, Recovery Column

Analyte	Method	Analyst	Sampling Date	Analysis Date	Detection Limit, ppm	Concentration ppm w/w
Acetone	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
Acrylamide	SW -846-8310	GAR	1/21-23/97	2/3-4/97	<1	28
Acrylic Acid	SW -846-8310	GAR	1/21-23/97	2/3-4/97	<1	520
Acrylonitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
Acetonitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
Propionitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
Methanol	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
MMA	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL
Toluene	SW-846-8420	CJW	1/21-23/97	2/3-4/97	<0.048	BDL
Formic Acid	HPLC	GAR	1/21-23/97	1/31/97	<10	54
Acetic Acid	HPLC	GAR	1/21-23/97	1/31/97	<10	410
Fumaronitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	78
Succinonitrile	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<50	1930
Benzene	SW-846-8420	CJW	1/21-23/97	2/3-4/97	<0.048	BDL
Pyrrolidine	SW -846-8000	JEM	1/21-23/97	2/3-6/97	<10	BDL

QA Data MET (T-500)

2/12/97 A-18

Analyte	Analyst	Initial ppm	Duplicate ppm	Recovery Percent
Acetone	JEM	250	250	98
Acrylamide	GAR	196	194	104
Acrylic Acid	GAR	267	266	108
Acrylonitrile	JEM	<10	<10	98
Acetonitrile	JEM	3500	3600	105
Propionitrile	JEM	45	51	105
Methanol	JEM	360	350	88
MMA	JEM	30	23	88
Toluene	CJW	7.2	6.2	68
Formic Acid	GAR	96	103	97
Acetic Acid	GAR	320	340	122
Fumaronitrile	JEM	<10	<10	92
Succinonitrile	JEM	1010	1130	93
Benzene	CJW	<0.048	<0.25*	89
Pyrrolidine	JEM	<10	<10	107

* GC-MS MET (T-500) duplicate analyzed on dilution, raising detection limit.

QA Data - Waste Acid Analysis

Analyte	Analyst	Initial ppm	Duplicate ppm	Recovery Percent
Methacrylic acid	GAR	2030	1970	98

A-19

Page : 2 of 2

Date: 03/19/97 05:27

Rpt# EF1020

[illegible]

WASTE WATER

A-20

Start Date: 11/05/96

End Date: 12/31/96

Out of Spec:

Page: 1 of 1
Date: 03/19/97 09:23
Rpt#: EF1000

Sample ID	Login Date	Sample Date	TKN	NH3-N	ppm TSS	ppm SO4	ppm TDS	ppm P-CN	ppm Cy-CN	% Asn	pH	% TDS
200047618	09/07/96	08/31/96	1.43	1.32	28	3.84	14330	241	1872	0.037	4.1	8.47
200047632	09/08/96	09/07/96	2.12	1.39	35	4.30	17780	250	2038	0.056	4.4	8.27
200048475	09/14/96	09/14/96	1.40	1.01	73	3.69	14855	260	1768	<.01	4.2	8.93
200049537	09/21/96	09/21/96	1.33	0.92	83	3.59	18212	208	2080	0.064	4.3	9.71
200050884	09/28/96	09/23/96	1.89	1.39	112	5.30	16010	268	1664	<.01	2.5	8.29
200051899	10/05/96	10/05/96	1.47	0.95	43	3.60	12914	221	1560	<.01	4.6	8.57
200052981	10/12/96	10/12/96	2.44	1.86	170	6.92	20465	286	2184	<.01	4.3	10.64
200054316	10/21/96	10/19/96	1.40	0.98	16	3.71	15045	251	1872	<.01	2.5	9.13
200056117	11/02/96	11/02/96	2.48	1.88	166	7.24	20510	312	2288	<.01	4.4	7.87
200057197	11/09/96	11/09/96	1.84	1.32	138	4.82	17470	319	2080	0.040	4.0	7.11
200059235	11/23/96	11/23/96	1.32	0.95	106	3.75	14415	267	1768	<.01	2.3	6.15
200061096	12/07/96	12/07/96	1.63	1.26	142	5.07	5780	286	1768	<.01	2.8	6.53
200061739	12/12/96	12/12/96										
200061900	12/13/96	12/13/96										
200062289	12/16/96	12/16/96	1.47	1.11	41	4.23	11552	189	1502	<.01	2.3	6.48
200063116	12/21/96	12/21/96	1.65	1.29	242	5.13	17445	345	2184	0.043	3.9	8.02
200064144	12/28/96	12/28/96	1.40	1.77	164	3.70	970	286	1768	<.01	4.8	11.86
200065227	01/04/97	01/04/97	2.03	1.60	154	5.70	18200	32	1872	0.105	4.3	9.28
200068024	01/21/97	01/21/97										
200068176	01/22/97	01/22/97										
200068327	01/23/97	01/23/97										
200068335	01/23/97	01/23/97	1.74	1.37	130	5.57	15530	25	1585	0.046	2.3	8.44
200068680	01/25/97	01/25/97	2.09	1.64	158	5.65	16875	32	2080	0.163	4.5	9.30
176441	03/15/97	03/15/97	2.03	1.51	282	10.65	18735	273	2080	<.01	4.1	8.64

TANK 500 (MKT)

A-21

Start Date 11/05/95

End Date 12/31/99

Out of Spec:

Page: 1 of 1
 Date: 03/09/97 13:26
 Rpts: EF1010

Sample Id	Login Date	Sample Date	ppm TKN	ppm NH3-N	% TDS	ppm TSS	ppm SO4	ppm TCC	ppm T-CN	ppm C/-CN	% Ash	pH
200047749	09/09/96	09/04/96	3800	522		6	594	10410	218	293	0.091	9.6
200047906	09/10/96	09/09/96	1100	176		11	746	5546	21	38	0.170	9.5
200048675	09/16/96	09/16/96	2400	317		21	390	7464	16	46	0.083	9.6
200052138	10/07/96	10/07/96	3000	543		16	530	9048	13	21	0.062	10.2
200053391	10/15/96	10/15/96	2200	492		16	113		504	558	0.091	9.5
200054025	10/19/96	10/19/96	2200	453		16	121		485	529	0.091	9.4
200057663	11/12/96	11/12/96	4000	1152		13	753	11870	819	75	0.197	9.3
200058113	11/15/96	11/15/96	3800	1029		65	361	10670	1183	1291	0.302	10.0
200060826	12/05/96	12/05/96	2200	409		13	288	6312	20	19	0.100	9.4
200061738	12/12/96	12/12/96										
200061898	12/13/96	12/13/96										
200062286	12/16/96	12/16/96	2900	420		67	67	7647	18	20	0.081	9.7
200065584	01/06/97	01/06/97	2700	262	0.91	41	375	8980	32	34	0.203	11.4
200065861	01/08/97	01/08/97										
200066765	01/14/97	01/14/97	3600	717	0.97	54	193	4966	29	10	0.078	10.7
200068023	01/21/97	01/21/97										
200068175	01/22/97	01/22/97										
200068326	01/23/97	01/23/97										
200068338	01/23/97	01/23/97	2100	1060	0.91	3	630	7020	36	76	0.105	11.4
200069040	01/27/97	01/27/97	1900	1289	0.56	25	584	2407	546	102	0.117	11.9
200069623	01/31/97	01/31/97	336	140		152	371	1000	36	19	<.01	12.8
200070066	02/04/97	02/04/97	370	175	0.49	18	354	1222	16	13	0.284	12.6
20072964	02/25/97	02/25/97	3464	447	0.79	11	275	12510	806	963	0.108	9.3

RECOVERY COLUMN BOTTOM

A-22

Start Date: 11/05/95

End Date: 12/31/99

Out of Spec:

Page: 1
Date: 03/19/97 15:1
Rpt#: EF1037

Sample Id	Login Date	Sample Date	% TKN	ppm NH3-N	% TDS	ppm TSS	ppm SO4	ppm COD	ppm T-CN	ppm CY-CN	% Asn	pH
200047823	09/09/96	08/08/96	0.29	259		7	247	7390	15	63	< .01	7.9
200052137	10/07/96	10/07/96	0.15	6546		143	20180	20706	1281	3232	< .01	5.3
200054515	10/22/96	10/22/96	0.44	541		46	113	10996	22	88	< .01	7.6
200057991	11/14/96	11/14/96	0.43	423		47	231	11785	16	1440	0.058	7.4
200059079	11/22/96	11/22/96	0.15	318		287	357	7435	12	22	0.073	10.3
200061460	12/10/96	12/10/96	0.33	301		88	216	4420	12	22	0.023	8.1
200061737	12/12/96	12/12/96										
200061876	12/13/96	12/13/96										
200062277	12/16/96	12/16/96										
200062278	12/16/96	12/16/96	0.28	478		14	29	6747	39	34	0.017	7.6
200064941	01/02/97	01/02/97	0.29	258	0.71	925	137	7255	12	63	< .01	7.1
200067180	01/16/97	01/16/97	0.22	233	0.88	21	154	6360	10	37	< .01	8.0
200067984	01/21/97	01/21/97										
200068173	01/22/97	01/22/97										
200068346	01/23/97	01/23/97										
200068348	01/23/97	01/23/97	0.32	882	0.90	126	444	5960	12	63	< .01	7.2
200071198	02/13/97	02/13/97	0.44	354	1.08	60	146	11325	29	44	0.060	6.6
200074491	03/05/97	03/05/97	0.64	456	1.54	8	239	15580	23	57	< .01	7.9

ACRYLO WASTE

A-23

Start Date: 02/17/97
End Date : 12/31/99
(* Out of Spec)

(Spec: - : Spec: -)

Page: 1 of 1
Date: 03/19/97 05:11
Rpt#: AN0200

Sample Id	Login Date & Time	Sample Date	Sample Time	T-500	NSB	WA	WW
200071876	02/18/97 03:38	02/17/97	19:00	0.995			1.040
200072315	02/21/97 03:47	02/20/97	19:30	0.998		1.453	1.035
200073036	02/25/97 23:15	02/25/97	19:00	0.994		1.450	1.050
200073242	02/26/97 21:35	02/26/97	19:00	0.997		1.400	1.035
200073793	03/02/97 03:36	03/01/97	19:00	0.998		1.453	1.030
200073944	03/03/97 03:21	03/02/97	19:00	0.996		1.455	1.035
200074142	03/04/97 03:46	03/03/97	19:30	0.998		1.452	1.035
200074780	03/07/97 00:52	03/06/97	19:00	0.995		1.457	1.040
200074993	03/07/97 22:22	03/07/97	19:00	0.996		1.450	1.040
200075766	03/12/97 03:50	03/11/97	19:00	0.997		1.453	1.035
200075945	03/13/97 03:46	03/12/97	19:30	0.998		1.450	1.035
200076158	03/14/97 04:06	03/13/97	19:30	0.997		1.453	1.040
200076532	03/16/97 03:44	03/15/97	19:00	0.996		1.400	1.035
200076675	03/17/97 00:24	03/16/97	19:00	0.997		1.450	1.035
200076899	03/18/97 02:11	03/17/97	19:00	0.995		1.400	1.040

CYTEC

CYTEC INDUSTRIES INC.
Fortier Plant
10800 River Road
Westwego, LA 70094
Tel: (504) 431-9511

Certified Mail No. P 162 426 752
Return Receipt Requested

January 5, 1998

James H. Brent, Ph.D.
Administrator
LDEQ/HWD-Permit Section
P.O. Box 82178
Baton Rouge, LA 70884-2178

Cytec Industries Inc. - Fortier Manufacturing Complex, Waggaman, Jefferson Parish,
EPA I.D. No. LAD 008175390
Request for Approval of a Class 1 Permit Modification
Addition of the MMA Lab Collection Tank 101-52 as a < 90 Days Unit

Dear Dr. Brent:

Cytec Industries Inc. (Cytec) - Fortier Manufacturing Complex (EPA I.D. No. LAD 008 175 390) is herein requesting LDEQ approval of a Class 1 permit modification as defined in LAC 33:V.322.G.1.d. and LAC 33:V.1905.H. The modification consists of the addition of a stainless steel tank with a nominal capacity of 40 gallons to be operated subject to the accumulation time exclusion of LAC 33:V.1109.E.1., i.e. as a less than 90 days unit. LAC 33:V.322.G.1.d. and LAC 33:V.1905.H. allow the addition of a new tank that will operate for up to 90 days after prior approval of the administrative authority.

Cytec intends to include this tank in the hazardous waste permit application to be submitted to LDEQ. However, in an effort to expedite placing the tank into service, Cytec is requesting that LDEQ approve this Class 1 permit modification, while LDEQ is reviewing the hazardous waste permit application and the addition of this tank as a permitted unit. Cytec will comply with all applicable regulations for less than 90 days tanks until such time as this tank is permitted, including but not limited to labeling and daily inspection.

Cytec is proposing the addition of this small tank and pump system to transfer MMA laboratory waste and small quantities of any hazardous waste generated on-site to the existing Miscellaneous Effluent (MET) system, in order to minimize the use of containers and the potential for spills or personnel exposure to hazardous chemicals. The design information is included in the accompanying Linder Report No. 97-2025M06 entitled, "Hazardous Waste Tank System, Design Assessment Certification, ACH Laboratory Waste Disposal System".

CYTEC

James H. Brent, Ph.D.
Page Two
January 5, 1998

The addition of this tank does not require modification of the existing air permit, because it is covered under Condition XVII as an insignificant activity. Furthermore, the tank will be specifically mentioned as an insignificant activity under Condition XVII of the MMA Plant Title V Permit Application. Cytec will also comply with the applicable portions of 40 CFR Parts 264/265 Subpart CC.

In general accordance with LDEQ's letter regarding "Submission of Correspondence and Bound Material" dated October 31, 1996, a total of five (5) bound copies are being submitted for review.

If you have any questions concerning the above or require additional information, please contact Ms. Stacy M. Foret at (504) 431-6479 or Ms. Anita Junker at (504) 431-6556.

I certify under penalty of the law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

This submission and any past or future communications or discussions regarding this matter are not intended to admit any fact of liability or waive or affect any rights.

Very truly yours,


Jaswant. S. Gill
Director - Building Blocks and Manufacturing

Enclosures

cc: Eric Garner, LDEQ HW-Permits Section - Baton Rouge, LA via fax 504-765-0617

CYTEC INDUSTRIES INC.
Waggaman, Louisiana

EPA ID No.: LAD008175390

HAZARDOUS WASTE TANK SYSTEM
DESIGN ASSESSMENT

ACH LABORATORY WASTE DISPOSAL SYSTEM



Report No. 97-2025M06

December 1997



WILLIAM H. LINDER
CHAIRMAN

LAWRENCE J. CACIOPPO P.E.
PRESIDENT

**HAZARDOUS WASTE TANK SYSTEM
DESIGN ASSESSMENT
CERTIFICATION**

I have performed a design assessment for the proposed ACH Laboratory Waste Disposal System at the Cytec Industries Inc. Fortier Plant located in Waggaman, Louisiana. The EPA ID Number for this facility is LAD008175390. The assessment performed is described and documented in the attached W.H. Linder & Associates, Inc. (LINDER) Report No. 97-2025M06, dated December 8, 1997. This assessment was performed to address the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 and 40 CFR 264.193 and the corresponding State of Louisiana requirements in LAC 33:V.1905 and LAC 33:V.1907.

With regard to this duty, I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my observations and my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Thomas H. Wimbrow
Registered Professional Engineer
Louisiana No. 23062

W.H. Linder & Associates, Inc.
3300 West Esplanade Avenue, Suite 300
Metairie, Louisiana 70002

Signed: 

Date: Dec 8, 1997



WILLIAM H. LINDER
CHAIRMAN

LAWRENCE J. CACIOPPO, P.E.
PRESIDENT

December 8, 1997
97-2025M06

Ms. Stacy Foret
Cytec Industries Inc.
10800 River Road
Westwego, Louisiana 70094

**Subject: Design Assessment for Proposed
ACH Laboratory Waste Disposal System**

Dear Ms. Foret:

Submitted here is our design assessment report for the proposed ACH Lab Waste Disposal System at the Methyl Methacrylate (MMA) Unit of Cytec's Fortier Plant. Our assessment was performed to assess compliance with the applicable requirements of 40 CFR 264.192 and 40 CFR 264.193 and LAC 33:V.1905 and LAC 33:V.1907.

The body of the report summarizes the assessment results in a format corresponding to the rules being addressed. Detailed information and documentation are presented in the report Appendices.

We have enjoyed working with you on this project, and look forward to another opportunity to be of service to Cytec. Please call me at 504-835-2577 if you have any questions.

Sincerely,

Thomas H. Wimbrow, P.E.
Sr. Environmental & Mechanical Engineer

Attachment: LINDER Report No. 97-2025M06

Dec 8, 1997

HAZARDOUS WASTE TANK SYSTEM

DESIGN ASSESSMENT

ACH Laboratory Waste Disposal System

For:

**CYTEC INDUSTRIES INC.
Waggaman, Louisiana**

By:

**W.H. Linder & Associates, Inc.
Metairie, Louisiana**

Report No. 97-2025M06

December 1997

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
SYSTEM DESCRIPTION	1
CONSIDERATIONS OF DESIGN ASSESSMENT	3
1. Design Standards	3
2. Hazardous Characteristics of the Waste	5
3. Corrosion Protection	6
4. Protection from Vehicular Traffic	8
5. Foundation Design	8
6. Ancillary Equipment	9
7. Pressure and Overfill Controls	10
SECONDARY CONTAINMENT PROVISIONS	11
CONCLUSIONS OF ASSESSMENT	14
TANK DATA SUMMARY	15
APPENDIX A - Design Documentation	
APPENDIX B - Design Review Documentation and Calculations	

HAZARDOUS WASTE TANK SYSTEM DESIGN ASSESSMENT

ACH Laboratory Waste Disposal System

This report documents the design assessment which was performed for the proposed ACH (Acetone Cyanohydrin) Laboratory Waste Disposal System in the Methyl Methacrylate (MMA) Unit of the Cytec Industries Fortier Plant located in Waggaman, Louisiana. The EPA ID No. for this facility is LAD 008 175 390. This assessment was performed and this report was prepared to verify and document compliance with the requirements of Resource Conservation and Recovery Act (RCRA) regulations in 40 CFR 264.192 and 40 CFR 264.193 and the corresponding State of Louisiana requirements in LAC 33:V.1905 and LAC 33:V.1907.

SYSTEM DESCRIPTION

In order to minimize the use of containers and the potential for spills or personnel exposure to hazardous chemicals, Cytec has proposed the installation of a small collection tank and pump system which will transfer laboratory waste materials to the existing Miscellaneous Effluent Treatment (MET) system for disposal by deep well injection. The proposed system will collect Acetone Cyanohydrin (ACH) and other laboratory waste materials from the lab in the Methyl Methacrylate (MMA) Unit via gravity flow piping. Detailed estimated waste composition data provided by Cytec is

SYSTEM DESCRIPTION (Continued)

included in Appendix A of this report. In addition, the proposed system may be utilized to manage small quantities of any hazardous waste generated on-site and approved for disposal via on-site deep well injection.

The waste will be directed to a 40 gallon nominal capacity Lab Sample Collection Tank (101-52) which will be located outside the MMA laboratory building. The approximate location of the Lab Sample collection Tank (101-52) is shown on the copy of the MMA Plant Diagram (Site Layout) included in Appendix A. When sufficient waste material has collected in the tank, level control instrumentation provided will automatically turn on an electric motor driven centrifugal pump (Lab Sample Pump 101-53) which will pump the waste into an existing MET system line for disposal via the on-site injection wells.

With the exception of one approximately nine (9) foot long section of double-wall stainless steel pipe which will be located below a concrete laboratory door landing area, all of the lab waste system components will be located above ground and be accessible for visual inspection. The tank and tank discharge pump will be located within a reinforced concrete above ground secondary containment vault.

Proposed Lab Sample Collection Tank 101-52 will be an 18 inch diameter by 36 inch long horizontal tank constructed of type 316 stainless steel. Although the tank will be vented to the atmosphere through a conservation vent and thus will operate at essentially atmospheric pressure, for conservatism it has been designed as an ASME Code pressure

SYSTEM DESCRIPTION (Continued)

vessel suitable for use at 50 psig. The majority of the new waste system piping and ancillary equipment components will be constructed of type 316 stainless steel. A portion of the gravity-flow waste collection piping will be constructed of clear PVC pipe in order to match existing drain system components located inside the MMA laboratory building.

The proposed tank system components are shown schematically on Cytec Piping & Instrumentation Diagram (P&ID) number 09-0-86 Issue 5, a copy of which is included in Appendix A of this report. Tank details are shown on Louisiana Maintenance Services Drawing 221 Rev. 2, also included in Appendix A.

CONSIDERATIONS OF DESIGN ASSESSMENT

1. Design Standards

The design of the waste system components was reviewed for compliance with the requirements of the following design codes and standards:

- American Society of Mechanical Engineers; *ASME Boiler and Pressure Vessel Code*

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)

1. Design Standards (Continued)

- American National Standards Institute / American Society of Mechanical Engineers; ANSI/ASME B31.3, *Process Piping*
- American National Standards Institute / American Petroleum Institute; ANSI/API Standard 2000 *Venting Atmospheric and Low-Pressure Storage Tanks*
- American Concrete Institute; ACI 318 *Building Code Requirements for Reinforced Concrete*

A copy of the ASME Form U-1A for the Lab Collection Tank is included in Appendix A. This document confirms that the tank has been designed and constructed in accordance with the requirements of the ASME Code. A copy of the Cytec Piping Material Specification used for this project (Specification S4D15 Rev. 3) is also included in Appendix A and confirms that the pressure piping and ancillary equipment designs used will be in compliance with the requirements of ANSI/ASME B31.3. Calculations included in Appendix B confirm that the tank normal and emergency venting provisions meet the requirements of API 2000. Review of the foundation design confirms that it meets the requirements of ACI 318.

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)

1. Design Standards (Continued)

In summary, the design review performed indicates that:

- The above design standards are appropriate for this application; and
- The system component designs conform to the standards referenced above.

The conclusion of the review performed is that the design of the new tank system is appropriate for the intended service. The structural strength, support, seams, and pressure controls are in accordance with design standard requirements.

2. Hazardous Characteristics of the Waste

The material handled by the ACH Lab Waste System will be on-site generated wastewater streams from the analytical chemistry laboratory located in Cytec Fortier's MMA production unit. The waste is projected to consist of about 99 percent water with small amounts of acetone cyanohydrin (ACH) potentially characterized by EPA Waste Codes P069 and D003; methyl methacrylate (MMA) potentially characterized by EPA Waste Codes U162 and D001; methanol potentially characterized by EPA Waste Codes U154, D001, and F003; acetone

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)**2. Hazardous Characteristics of the Waste (Continued)**

potentially characterized by EPA Waste Codes U002, D001, and F003; and spent sulfuric acid, sodium hydroxide, and nitric acid all characterized by EPA Waste Code D002; along with small amounts of several spent laboratory reagent materials.

The primary hazardous characteristics of these materials are Toxicity (EPA Hazard Code "T"), Ignitability (EPA Hazard Code "I"), and Corrossivity (EPA Hazard Code "C"). In the diluted form in which they will be handled by this waste system, the waste will not be either Ignitable or Corrosive. Detailed estimated waste composition data provided by Cytec is included in Appendix A of this report.

3. Corrosion Protection

With the exception of one approximately nine (9) foot long section of tank inlet piping, the new waste system components will not be in contact with soil or groundwater. Therefore, corrosion-resistant materials of construction, a corrosion-resistant coating with cathodic protection, or electrical isolation devices are not required for soil or groundwater corrosion protection for those components. All system components are, however, constructed of corrosion resistant materials.

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)**3. Corrosion Protection (Continued)**

One approximately nine foot long section of tank inlet piping must be run under a laboratory building concrete landing area in order to provide gravity flow drainage of waste to the collection tank. This portion of the system piping will be completely encased by and in contact with the concrete of the landing itself. The section of this pipe which will be below grade will be made with double wall construction. A detail drawing of the double wall pipe design is included in Appendix A. Both the inner and outer pipes of the double wall section will be constructed of type 316L stainless steel to provide corrosion resistance against contact with the concrete and the waste being handled. Robert Smallwood, Cytec Chief Materials Engineer and a corrosion expert, has reviewed the application and determined that the corrosion resistant materials of construction used will ensure the integrity of the tank system against corrosion due to contact with concrete, soil, or water.

A portion of the new waste collection piping will also be constructed of clear PVC to match the existing lab sink drain piping to which it will be connected. Review of published compatibility data, consultation with the PVC pipe manufacturer's representative, and past experience at this facility have confirmed that this material will be compatible with the waste materials in the concentrations in which they will be present.

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)

3. Corrosion Protection (Continued)

The majority of the new waste system piping, the waste collection tank, and the system pump, valves, and other ancillary equipment items will be constructed of type 316 stainless steel. Published corrosion data and past experience at this facility have confirmed that the waste stream will be compatible with and not corrosive to that material of construction.

In summary, a review of the corrosion protection measures and materials of construction used indicates that they should provide satisfactory protection from corrosion and adequate service life under the intended service conditions.

4. Protection from Vehicular Traffic

All of the new waste system components will be located in areas where they will not be subject to vehicular traffic induced loads.

5. Foundation Design

The Lab Waste Collection Tank and pump will be supported by a six-inch thick reinforced concrete slab-on-grade foundation and concrete pump support pad.

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)**5. Foundation Design (Continued)**

The foundation design has been specified to meet ACI 318 and other applicable design and material specifications. Review of the foundation design confirms that it will be satisfactory to support the loads from the system tank when full and the loads from the pump and other ancillary equipment items. The new system piping and other ancillary equipment components will be supported in accordance with ASME B31.3 requirements by a combination of new and existing pipe supports and equipment. The system components will not be in a saturated zone, so special anchorage to resist flotation or dislodgement is not required. The system will be in a zone of low seismic activity (Zone 0 from ASCE 7-88) so special earthquake anchorage provisions are not required. The system components will also not be subject to excessive stress or damage from frost heave.

6. Ancillary Equipment

Ancillary equipment for the new Lab Collection Tank waste system includes the tank discharge pump, inlet and discharge piping, tank normal and emergency vents, and the valves and instrumentation used to control the flow of waste. The system ancillary equipment components have been specified to meet the design and installation requirements of ASME B31.3 and API 2000. Compliance with

CONSIDERATIONS OF DESIGN ASSESSMENT (Continued)**6. Ancillary Equipment (Continued)**

the requirements of those codes will ensure safe and satisfactory design and operation. The ancillary equipment support provisions which have been specified along with the location of the components will provide satisfactory support and protection against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.

7. Pressure and Overfill Controls

Calculations included in Appendix B confirm that the two (2) inch conservation vent specified will provide the Lab Collection Tank with both normal and emergency venting capacity which meets the requirements of API 2000. The tank is also provided with an overflow pipe which will direct excess liquid resulting from overfilling of the tank into the secondary containment vault where it will be retained for detection and removal. The overflow connection will be provided with a water seal leg to prevent the venting of tank vapors from the overfill pipe. The seal leg will be provided with a sight glass and fill connection to maintain the water seal. Check valves will be provided in the system discharge piping to prevent the backflow of material into the Lab Collection Tank when Lab Sample Pump 100-53 is not operating.

SECONDARY CONTAINMENT PROVISIONS

Lab Sample Collection Tank 101-52, Lab Sample Pump 101-53, and the waste system valves and connections in the Collection Tank area will be located inside a reinforced concrete secondary containment vault. Details of the containment vault design are indicated on design drawing Number 9-1-65 included in Appendix A. Lab Sample Collection Tank 101-52 will be elevated above the concrete secondary containment vault floor on saddle supports to provide leak detection by visual inspection.

The secondary containment vault has been designed to prevent any migration of wastes or accumulated liquid out of the system to the soil, groundwater or surface water at any time during the use of the tank system and to be capable of detecting and collecting releases and accumulated liquids until the collected liquid is removed.

The secondary containment vault will be constructed of reinforced concrete and will be compatible with the wastes which will be placed in the tank system. The containment vault will have sufficient strength and thickness to prevent failure owing to pressure gradients, physical contact with the waste to which it may be exposed, climatic conditions, and the stress of daily operation. The secondary containment system will be provided with a foundation capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and be capable of preventing failure due to settlement, compression, or uplift.

The secondary containment system is designed so that it will disclose the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system at any time.

SECONDARY CONTAINMENT PROVISIONS (Continued)

The floor of the secondary containment vault will be sloped to provide drainage to a small collection box or sump. The vault sump will facilitate detection and removal of spilled or leaked waste and accumulated precipitation.

Calculations in Appendix B confirm that the secondary containment vault has been designed to have sufficient capacity to hold 100 percent of the capacity of the Lab Collection Tank plus sufficient excess capacity to contain approximately 12.2 inches of rainfall. The 25-year, 24-hour rainfall depth specified for this area in the Louisiana DOTD Hydraulics Manual is 9.6 inches. Run-on from adjacent Control Room roof areas will be prevented by gutters and downspouts which will direct rainwater from those areas away from the secondary containment vault. The vault will also be provided with a sump pump operated by a level switch. The sump pump will automatically be turned on and will pump liquids from the vault into the Lab Collection Tank when the liquid level in the vault rises. Rainwater and liquids in the Lab Collection Tank will then automatically be pumped to the MET system for disposal. The secondary containment vault has therefore been designed and can be operated so as to contain the full contents of the tank plus water from a 25-year, 24-hour rainfall event without overfilling.

The containment vault design drawing confirms that the vault will be constructed with chemical-resistant water stops in all concrete joints. The vault will be constructed of concrete which is compatible with the waste being stored and that is sufficiently impervious to the waste being stored to prevent significant migration of waste into the concrete in the event of a spill or leak.

SECONDARY CONTAINMENT PROVISIONS (Continued)

While the concentrations of waste which the system will handle are neither ignitable nor reactive, the vault's low walls and open top would prevent the accumulation of significant quantities of ignitable or explosive vapors should such vapors be present.

The vault will be located essentially at ground level and will thus not be subject to external hydraulic pressure. Exterior moisture barriers or other design features to prevent migration of moisture into the vault are therefore not required.

With the exception of one approximately nine (9) foot long section of below-grade double wall pipe, all of the system piping and all of the system valves, joints, flanges, and connections will be located aboveground and will be accessible for daily visual inspection for the detection of leakage. The double wall pipe will be sloped and provided with a drain connection into the vault area which will provide for the detection of a failure of either the primary or secondary containment pipes. The majority of the system valves, joints, flanges, and connections will also be located within the tank containment vault area.

Cyttec's Fortier Plant hazardous waste pipeline network has been exempted from the secondary containment requirements of LAC 33:V.1907.F in a variance granted by LDEQ-HWD in accordance with LAC 33:V.1907.G.2 (reference LDEQ letter of November 20, 1991). Compliance with the requirements of LAC 33:V.1907.F is therefore not required for the system piping equipment components.

CONCLUSIONS OF ASSESSMENT

Based on the assessments performed and the information presented above and included in the Appendices of this report, the proposed ACH Lab Waste Disposal System at the Cytec Industries Fortier Plant in Waggaman, Louisiana has been designed to have sufficient structural strength and be sufficiently compatible with the waste which will be handled to not leak, collapse, rupture, or fail under its intended service conditions. The system components have been designed in accordance with the requirements of applicable codes and standards using materials which are compatible with the waste which will be handled. The system tank will be provided with secondary containment provisions whose design meets the requirements of LAC 33:V.1907. The system piping components are exempt from the secondary containment requirements of LAC 33:V.1907.F.

TANK DATA SUMMARY

The following is a summary of pertinent data for the MMA Lab Collection Tank:

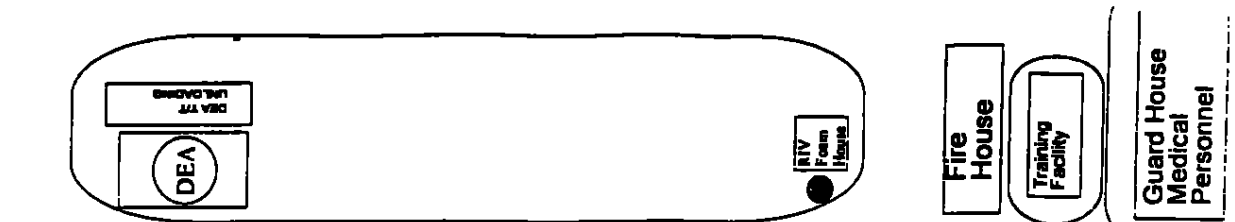
Tank:	MMA Lab Collection Tank 101-52
Service:	Storage
Design Code:	ASME Boiler and Pressure Vessel Code
Nominal Capacity:	40 gallons
Design Pressure:	50 psig
Operating Pressure:	Atmospheric
Max. Design Temperature:	400 F
Operating Temperature:	Ambient (less than 120 F)
Inspection Standard:	API 510
Nominal Original Shell Thickness:	1/4 inch
Shell Thick. Required for Pressure:	0.029 inch
Minimum Allowable Shell Thickness*:	0.100 inch

* Conservative value at which a detailed investigation of corrosion characteristics should be performed. Actual minimum allowable shell thickness should be determined using the procedures and calculation methods given in API 510.

APPENDIX A
Design Documentation

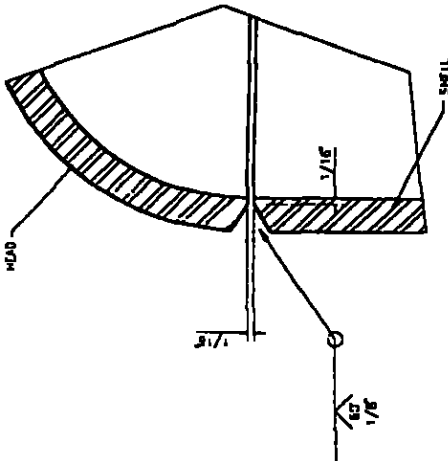
APPENDIX A**Design Documentation****TABLE OF CONTENTS**

<u>Title</u>	<u>Page No.</u>
MMA Plant Diagram (Site Layout)	A-1
Cytec ACH Stock Tanks and Wastewater System P&ID Dwg. 09-0-86 Issue 5 (proposed)	A-2
Louisiana Maintenance Services 18" OD Lab Collection Tank Drawing No. 221 Rev. 2 (2 sheets)	A-3
Cytec Double Wall Drain Pipe Isometric Drawing	A-5
Cytec / CYRO MMA Control Building Vestibule Concrete Details Drawing No. 9-1-65 Issue 0	A-6
ASME Form U-1A for Lab Collection Tank Dated 7-29-97	A-7
Cytec / CYRO Lab Sample Pump Specification 304258-EQ2 Issue 1	A-9
Fortier Plant Horizontal Centrifugal Pump Data Sheet Item No. 101-53 Rev. 1 ..	A-13
Goulds Pump Proposal B04187RMKT05CA Rev. 3	A-16
Goulds Model 3796 STX Performance Curve 725.4C4	A-18
Cytec Pressure Vacuum Vent Specification Sheet Tag No. PSV-6502 Issue 0 ...	A-19
Oceco Series 94 Flow Capacity Curves S-1865	A-20
Excelon R-4000 Transparent PVC Pipe and Fitting Data	A-21
Cytec Piping Materials Specification No. S4D15 Rev. 3	A-26
Cytec ACH Laboratory Waste System Estimated Waste Composition	A-30

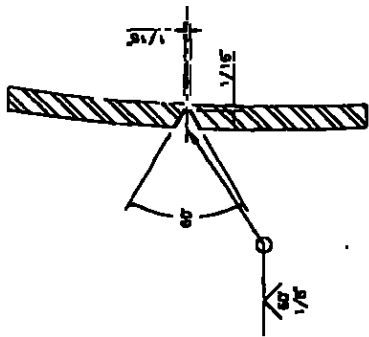


Appro

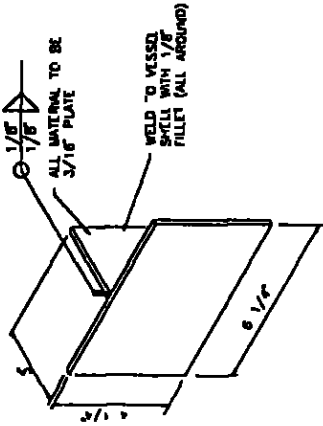
Date:



HEAD TO SHELL WELD DETAIL
FULL SCALE



LONG SEAM
WELD DETAIL
FULL SCALE

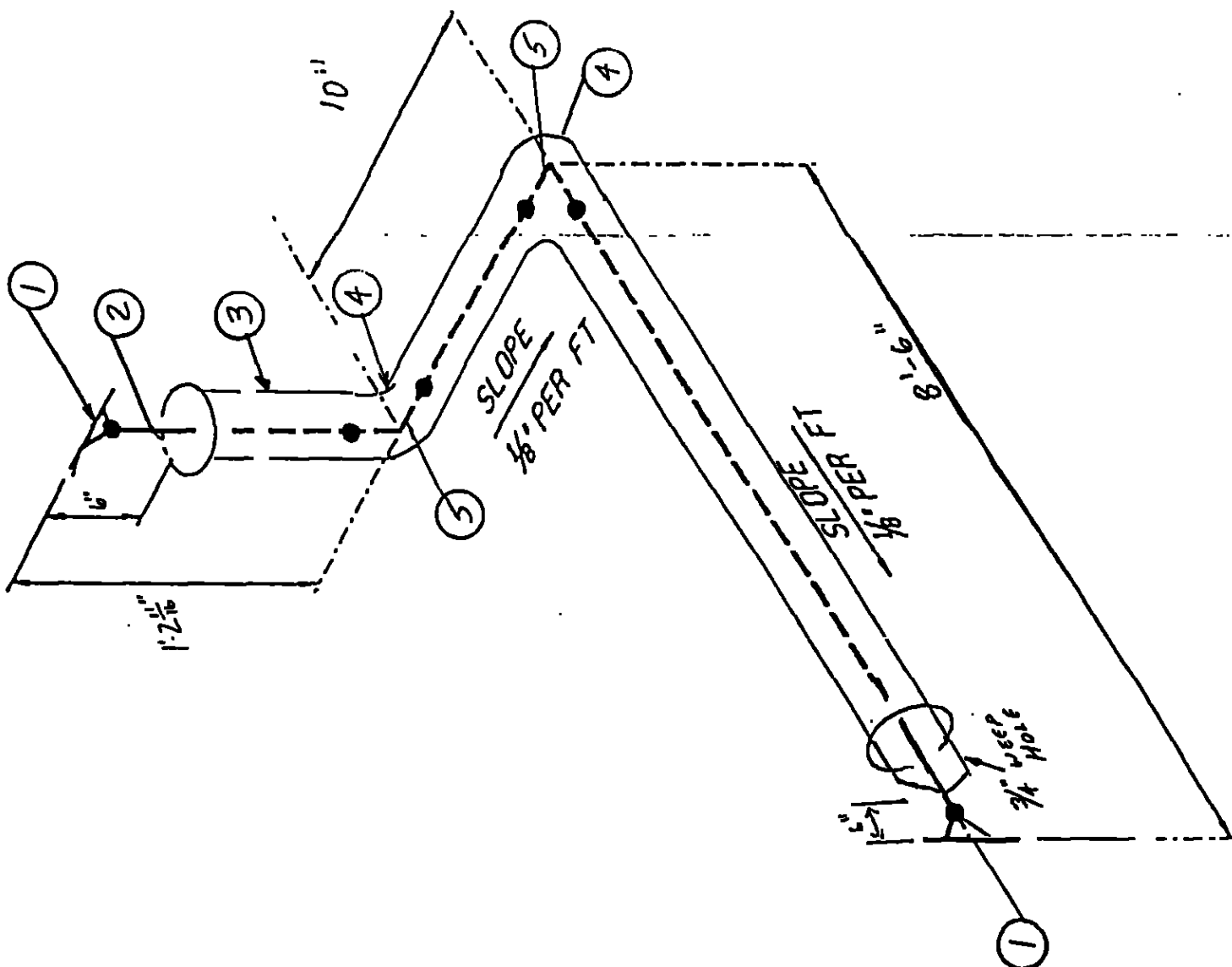


NAMEPLATE BRACKET
NONE

ITEM	REQ'D.	PART	DESCRIPTION	MATERIAL
1	1	SHELL	1/4" x 28.5" x 60" PLATE	SA240-316L
2	1	HEAD	18" O.D. x 1/4" THK. ASME F & D	SA240-316L
---	---	---	HEAD W/ 1.125" I.C.R. & 1.5" S.F.	---
3	1	BODY FLG.	18" 150# RFWN SCH 10 BORE FLANGE	SA182-F316L
4	1	BLIND FLG.	18" SPECIAL PLATE FLANGE	SA240-316L
---	---	---	ALL DIMENSIONS PER ANSI B16.5, 150#	---
---	---	---	EXCEPT WITH 1" THICKNESS	---
5	18	STUDS	1.125" x 5.25" LS STUDS	SA193-8BV
6	32	NUTS	1.125" HEX NUTS	SA194-8V
7	3	FLANGE	2" 150# RFWN S/40S BORE FLANGE	SA182-F316L
8	2	FLANGE	1.5" 150# RFWN S/40S BORE FLANGE	SA182-F316L
9	2	FLANGE	1" 150# RFWN S/160 BORE FLANGE	SA182-F316L
10	2 L.F.	NECK	2" SCH 40S PIPE	SA312-F316L
11	3 L.F.	NECK	1.5" SCH 40S PIPE	SA312-316L-S
12	1 L.F.	NECK	1" SCH 160 PPE	SA312-316L-S
13	1	NOZZ "E"	1.5" SCH 40S 90° ELL	SA403-316L-WPS
14	1	NOZZ "D"	3" SCH 40 B.W. PIPE CAP	SA403-316L-WPS
15	1	NOZZ "D"	3" x 1.5" ECC SWAGE, BRE. SCH 40S	SA403-316L-WPS
16	3 S.F.	SADDLES	1/4" PLATE	SA240-316L
17	1 S.F.	VORTEX	1/4" PLATE	SA240-316L
18	1	N.P. BRACKET	3/16" x 8.5" x 16"	SA240-304
19	1	GASKET	18" 150# 1/16" THK. RING GASKET	GRAFOLJ_OHR
---	---	---	---	---
---	---	---	---	---

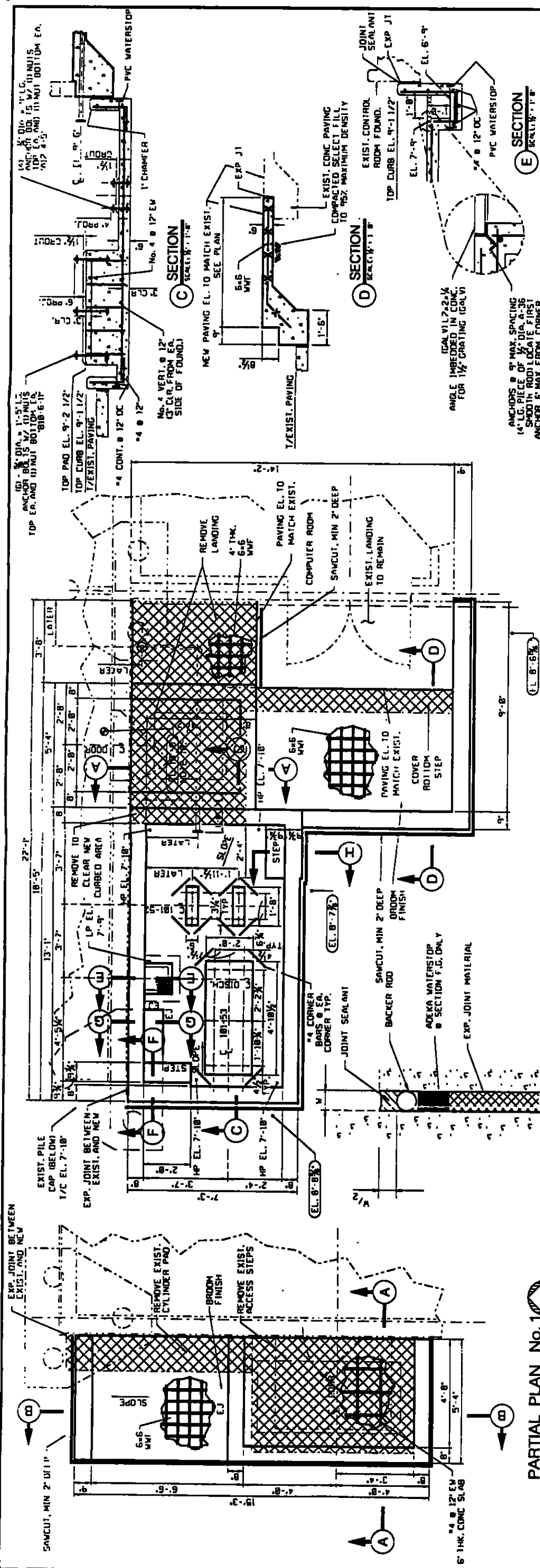
OWNER INFORMATION	
OWNER: CYRO INDUSTRIES - MMA PLANT	
ITEM NO:101-52	
P.O. NO.:SW116191	
ENGR: N/A	
PROJECT:	
2	CRC 7/97 CERTIFIED AS-BUILTS
1	CRC 5/97 CERTIFIED ISSUED FOR CONSTRUCTION.
0	CRC 8/97 ISSUED FOR APPROVAL
REV.	BY DATE DESCRIPTION

Louisiana Maintenance Services	
P.O. BOX 1009	
HAHNVILLE, LOUISIANA 70057	
PH. (504) 783-2082 FAX (504) 783-6418	
THIS DRAWING IS THE PROPERTY OF MAINTENANCE SERVICES. IT SHALL NOT BE REPRODUCED, COPIED, LOANED, OR OTHERWISE DISSEMINATED TO ANY OTHER PARTY WITHOUT THE WRITTEN PERMISSION OF MAINTENANCE SERVICES.	
DESIGNED BY CAC	DATE 06/97
CHECKED BY B-W	DATE 06/97
DATE 101-52	DATE 97-624
16" OD LAB COLLECTION TANK	
SHEET NO. 221	
2 OF 2	

[illegible]

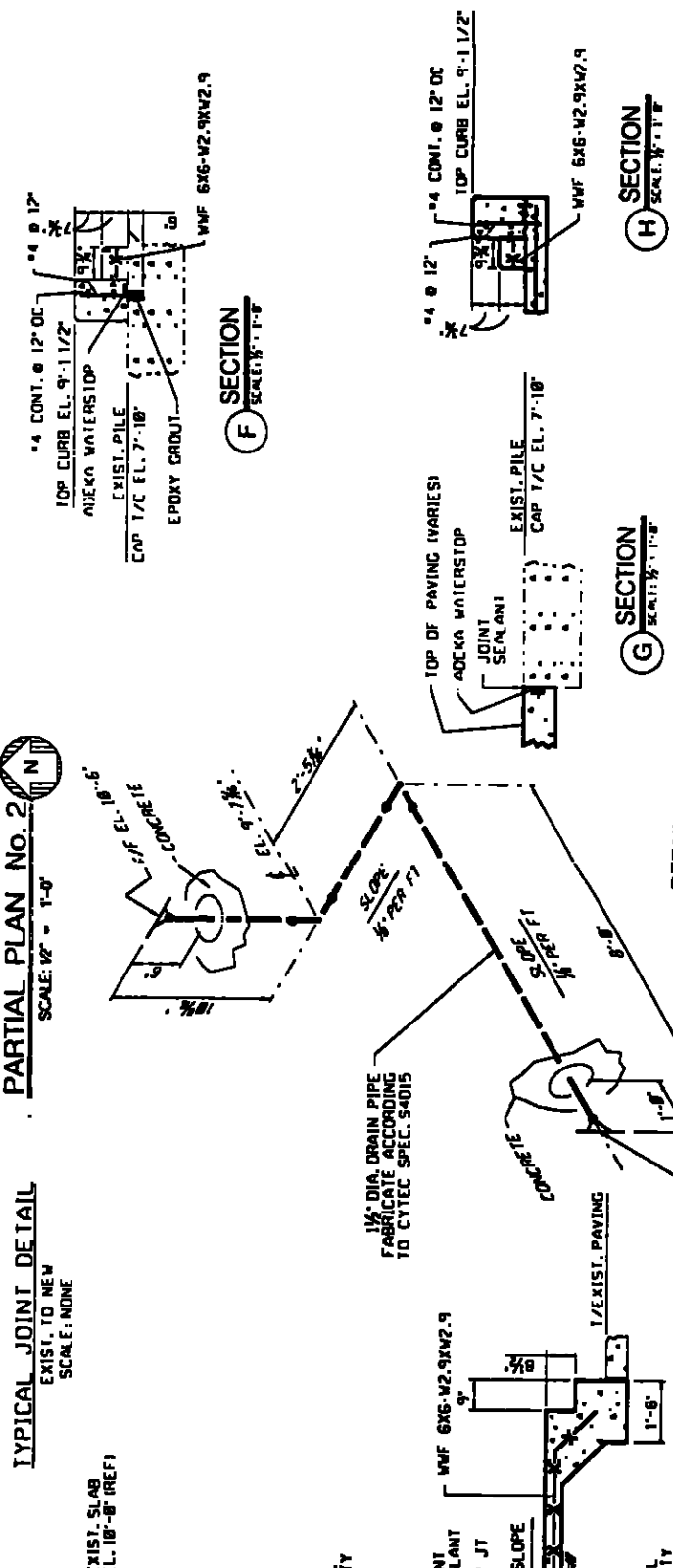
THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION OR FABRICATION UNTIL SIGNED AS CHECKED AND ISSUED FOR CONSTRUCTION.

DETAILED BY PROJECT SERVICES					
REFERENCE DRAWINGS	NOTES	FABRICATION DETAIL			OWN BY
		SYSTEM	SPEC.	INSUL.	DATE
		DRAIN	54 DIS	NO	2-9
				NO	DATE
				NO	APPROVAL
				NO	SCALE
				X-RAY	
				HYDRO	



PARTIAL PLAN No. 2
SCALE: 1/8" = 1'-0"
N

1. CONCRETE SHALL BE DESIGNED AND SUPPLIED IN ACCORDANCE WITH ACI 318I AND ASTM C394. ALTERNATE 2. CONCRETE SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI @ 28 DAYS
2. CONCRETE SHALL HAVE 1.5 LB/CY POLYPROPYLENE FIBERS INCLUDED IN THE MIX (AT CONTAINMENT AREA ONLY).
3. ALL CONCRETE SHALL BE CURED BY USING AN OWNER APPROVED SPRAY ON CURING COMPOUND.
4. EXCAVATED MATERIAL SHALL BE USED FOR FILL AND COMPACTED TO 95% MAXIMUM DENSITY.
5. MATERIALS SHALL CONFORM TO THE FOLLOWING:
 - PORTLAND CEMENT ASTM C150 TYPE 1
 - REINFORCING STEEL ASTM A615, GRADE 60
 - JOINT REPAIR MESH ASTM A185
 - JOINT SEALANT SONSMEITH C1-1
 - CRAFFT EPOXY
 - FILL "CLEAN RIVER SAND" COMPACTED AS INDICATED
6. CONTRACTOR SHALL OBTAIN 4 CONCRETE SAMPLES AND SUBMIT SAME TO AN OUTSIDE LABORATORY FOR TESTING. TEST @ 7 DAYS, @ 28 DAYS AND 1 SPARE. SUBMIT TEST RESULTS TO OWNER'S PROJECT ENGINEER. PROVIDE 1 COMPLETE SET UP TEST SAMPLES FOR EACH 50 CU. YDS.
7. EXPOSED CONCRETE EDGES SHALL HAVE A 1' X 1' CHAMFER.
8. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
9. USE ADMIXTURES AS REQUIRED FOR MAX. W/C RATIO = .39 @ CONTAINMENT AREA ONLY
10. CONSTRUCTION DEMONSTRATE 15' TOP OF FINISHED FLOOR IN LAB AREA (ELL 1B) - BT
11. SCOPE OF DEMOLITION WORK IS: CONCRETE PAVING BEHIND NEW CONCRETE AND AREAS INDICATED BY HATCHING.

[illegible]

FORM U-1A MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
(Alternative Form for Single Chamber, Completely Shop-Fabricated Vessels Only)
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by LOUISIANA MAINTENANCE SERVICES, INC., 16179 River Road, Hahnville, LA 70057
 (Name and address of manufacturer)

2. Manufactured for CYRO Industries - MMA Plant, 10800 River Road, Westwego, LA 70094
 (Name and address of purchaser)

3. Location of installation Same as No. 2
 (Name and address)

4. Type Horizontal 97-624 N/A 221 R2 76 1997
 (Horiz. or vert. tank) (Mfg's serial No.) (CRN) (Drawing no.) (Natl Bd. No.) (Year built)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the **ASME BOILER AND PRESSURE VESSEL CODE**. The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1 1995
 Year

to 1995 N/A Lethal Service
 Addenda (Date) Code Case Nos. Special Service per UG 120(d)

6. Shell: SA-240 Ty 316L 1/4" 1/16" 1'-5.5" 2'-4.5"
 Mat'l. (Spec. No., Grade) Nom. Thk. (in.) Corr. Allow. (in.) Diam. I.D. (ft. & in.) Length (overall) (ft. & in.)

7. Seams: Welded, Ty 1 Full 100 --- --- Welded, Ty 1 Full 1
 Long. (Welded, Dbl., Sngl., Lap, Butt) R.T. (Spot or Full) ER (%) H.T. Temp (F) Time (hr) Girth (welded, Dbl., Sngl., Lap, Butt) R.T. (Spot, Partial, or Full) No. of Courses

8. Heads: (a) Mat'l. SA-240 Ty 316L (b) Mat'l. SA-240 Ty 316L
 (Spec. No., Grade) (Spec. No., Grade)

	Location (Top, Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)	End	1/4"	1/16"	18"	1-1/8"					Concave
(b)	End	1"	1/16"						21"	Concave

If removable, bolts used (describe other fastenings) 8(b) - (20) - 1-1/8" x 5-1/4" LG. SA193-B8M Studs w/ SA194-8M Hex Nuts
 (Mat'l., Spec. No., Gr., Size, No.)

9. MAWP 50 psi at max. temp. 400 ° F
 Min. design metal temp. -20 ° F at 50 psi. Hydro., --- or --- test pressure 80 psi.

Nozzles, inspection and safety valve openings:

Purpose (Inlet, Outlet, Drain)	No	Diam. or Size	Type	Mat'l.	Nom. Thk.	Reinforcement Mat'l.	How Attached	Location

11 Supports: Skirt No Lugs No Legs No Other 2-Saddles Attached Welded to Shell
 (Yes or no) (No.) (No.) (Describe) (Where and how)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report:

(Name of part, item number, Mfg's name and identifying stamp)
8(b) Flat Head bolts to 18" 150# RFWN ANSI B16.5 Body Flange(SA182-F316L). CYRO Industries
10. See U-4 Form for nozzle opening. P.O. # SW116191
Impact Test Exempt-UHA-51(d) (1) (a). Inspection Openings UG-46(f) (5). Item No. 101-52

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. "U" Certificate of Authorization No. 24782 expires April 27, 19 99
 Date July 29, 1997 Co Name LOUISIANA MAINTENANCE SERVICES, INC. Signed Kerri Yeats
 (Manufacturer) (Representative)

CERTIFICATE OF SHOP INSPECTION

Vessel constructed by LOUISIANA MAINTENANCE SERVICES, INC. at Hahnville, LA 70057
 I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of LA and employed by Kemper Insurance Companies have inspected the component described in this Manufacturer's Data Report on 7-29, 19 97, and state that, to the best of my knowledge and belief, the manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.
 Date July 29, 1997 Signed [Signature] Commissions 5763 AB LA 0476
 (Authorized Inspector) (Natl Board (incl. endorsements) State, Prov and No.)

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by LOUISIANA MAINTENANCE SERVICES, INC., 16179 River Road, Hahnville, LA 70057

(Name and address of Manufacturer)

2. Manufactured for CYRO Industries - MMA Plant, 10800 River Road, Westwego, LA 70094

(Name and address of Purchaser)

3. Location of Installation Same as No. 2

(Name and address)

4. Type: Horizontal

(Horiz., vert., or sphere)

Tank

(Tank separator, heat exch., etc)

97-624

(Mfg's serial No.)

N/A

(CRN)

221(Sht 1 & 2) R.2

(Drawing No.)

76

(Nat'l. Bd. No.)

1997

(Year built)

Data Report Item Number	Remarks							
10. PURPOSE	NO.	DIA./SIZE	TYPE	MATERIAL	THICKNESS	REINFORCEMENT	HOW ATTACHED	LOCATION
(1)	3	2" 150#	RFWN	SA312-316L-S	.154	---	UW16.1(c)	Shell
Outlet/Suction	1	1.5" 150#	RFWN	SA403-316L-WPS	.145	---	UW16.1(c)	Shell
Tank Inlet	1	1.5" 150#	RFWN	SA312-316L-S	.145	---	UW16.1(c)	Shell
Level Indicator	2	1" 150#	RFWN	SA312-316L-S	.250	---	UW16.1(c)	Flat Head
<u>(1)-Level Indicator, Vent/Overflow, and Recycle Inlet.</u>								
<u>Outlet/Suction nozzle composed of 3" S/40S BW pipe cap and 3" x 1.5" S/40S eccentric</u>								
<u>Reducer.</u>								
<u>RFWN FLANGE - SA182-F316L</u>								

Certificate of Authorization Type U No. 24782 Expires April 27, 19 99

Date July 29, 1997 Name LOUISIANA MAINTENANCE SERVICES, INC.

(Manufacturer)

Signed Keri Yeato
(Representative)

Date July 29, 1997 Name *[Signature]* Commission

(Authorized Inspector)

5763 AB LA 0476
(Nat'l Board (incl. endorsements) State, Province and No.)

CYRO INDUSTRIES
MMA LAB SAMPLE DISPOSAL

SPEC 304258-EQ2
ISSUE 1, 5/29/97

Lab Sample Pump

**Lab Sample Pump
Specification 304258-EQ2**

**For
CYRO Industries
Fortier MMA Plant
Westwego, LA**

<u>Issue</u>	<u>Description</u>	<u>Date</u>
0	Original	05/29/97
1	For Purchase	06/19/97

**CYRO INDUSTRIES
MMA LAB SAMPLE DISPOSAL****SPEC 304258-EQ2
ISSUE 1, 5/29/97****Lab Sample Pump**

1.0 General

This specification, together with the pump data sheet attached, establishes minimum requirements for the design, materials, fabrication, testing, inspection, and shipment of a Centrifugal Process Pump for CYRO Industries in CYTEC's Fortier Plant, Louisiana.

TAG NO.
101-53

ITEM
Lab Sample Collection Pump

TYPE
ANSI/ASME B73.1M

1.1 Precedence

All conflicts between the requirements of this specification, codes, standards, purchase orders, drawings, and data sheets shall be referred to the purchaser for clarification before proceeding with fabrication.

1.2 Alternates

Vendor's proposal shall be in strict accordance with this specification, the Pump Data Sheet, and any attachments.

If Vendor wishes to take exception or propose alternatives, he shall completely describe each exception and/or alternate and indicate the adjustments to his proposed price and delivery.

- 1.3** Compliance with this specification shall not relieve the manufacturer of responsibility for furnishing pumps of proper design, workmanship, and materials to meet the specified operating conditions.

2.0 Pump Design

- 2.1** The pump shall be furnished in accordance with Cytec's Engineering Standard ES-1201, Standard for Selection & Installation of Horizontal Single-Stage Centrifugal Pumps. The pump shall be classified Chemical Service and Shall be in accordance with ANSI/ASME B73.1M where noted.
- 2.2** Vendor shall complete the Pump Data Sheets and submit with his proposal and with drawing submittals.
- 2.3** Pump to have a Mechanical seal. Seals to be Durametallc Single Unbalanced Type RO-TT. Vendor to provide stainless steel tubing for seal flush.

3.0 Drivers

- 3.1** Drivers shall be furnished and mounted by pump manufacturer and complete assembly shipped as a unit.
- 3.2** Motors shall be TEFC, chemical plant type in accordance with Cytec's "Standard for Chemical Process Induction Motors", Number REQC-N-2 and suitable for Class I, Group D, Division 2, Hazardous Area Classification.

**CYRO INDUSTRIES
MMA LAB SAMPLE DISPOSAL**

**SPEC 304258-EQ2
ISSUE 1, 5/29/97**

Lab Sample Pump

- 3.3 Driver and couplings shall be sized based on the maximum pump brake horsepower (end of curve) for the rated impeller at the specific gravity specified. Couplings shall be Renard Omega.

4.0 Materials

Materials of Construction shall conform to the latest edition of ASTM, or other recognized standards

5.0 Pump Casings

The maximum allowable working pressure of the pump casing shall not be less than 110% of the discharge pressure developed at pump shut-off.

6.0 Balancing

All rotating parts shall be statically balanced. Dynamic Balance shall be done when specified or if manufacture's standard practice.

7.0 Shop Inspection and Tests

- 7.1 All pumps shall be hydrostatically tested. Certification of the tests results is required. Performance testing is not required unless it is a normal manufacturing procedure on the part of the vendor or specified on Data Sheet.
- 7.2 NPSH available, as shown on the Requisition Data Sheet is a minimum and may be exceeded at time in actual operation. However, NPSH Required must be less than NPSH available at design condition. When noted on the data sheet, Vendor shall conduct NPSH tests.
- 7.3 The manufacturer shall notify the purchaser not less than five days prior to the date the pump or pumps will be ready for inspection or witness test.
- 7.4 Acceptance of shop test shall not constitute a waiver of requirements to meet field tests under specified operating conditions, nor does inspection relieve the manufacturer of his responsibilities in any way whatsoever.

8.0 Painting

Vendors standard painting is acceptable.

9.0 Drawing and Data Requirements

Vendor shall furnish sepia or other reproducible and/or copies of all documents noted below as part of this specification. Documents shall be checked by Seller prior to submittal for review. All documents shall be sent via first class mail to the address on the Purchase Order. Each document must be marked with our purchase order number and equipment identification (tag) number.

CYRO INDUSTRIES
MMA LAB SAMPLE DISPOSAL

SPEC 304258-EQ2
ISSUE 1, 5/29/97

Lab Sample Pump

Quantity Req'd Repros/ Copies	Description	Weeks Req'd
1/1	Outline Drawings	W/BID
1/1	Performance Curves	W/BID
1/1	Completed Data Sheets	W/BID
/2	Certified Outline Drawings	2 ADA
1/4	Collated sets of the following: -Completed Data Sheet -Certified Performance Curve -Mech. Seal Dwg -Motor Information Sheets -Parts lists Complete -List of spare parts recommended for one year's operation w/prices and delivery -Operation & Maintenance Manuals -Installation & Erection Instructions -Auxiliary Piping Plan (Certified)	4-6 ARO
ARO- After Receipt of Order ADA- After Drawing Approval AES- After Equipment Shipped		

FORTIER PLANT
HORIZONTAL CENTRIFUGAL PUMP
DATA SHEET

JOB NO. 304258-60 ITEM: NC.(S) 101-55

A-13

PURCHASE ORDER NO. _____

REQUISITION NO. _____

INQUIRY NO. _____

PAGE 1 OF 3

SUPPLIER COMPLETES ALL LINES MARKED X

☒ PROPOSAL ☐ PURCHASE ☐ AS BUILT ☐ SERVICE

NO. PUMPS REQ'D. 14 Spare Units NO. MOTORS REQ'D. 1

NO. TURBINES REQ'D. _____

PUMP MFR _____ SIZE & TYPE _____

BRG FRAME _____

FACTORY ORDER NO(S) _____

SERIAL NO(S) _____

OPERATING CONDITIONS - EACH PUMP

LIQUID/SLURRY: Water with traces of MMA, methanol, ALH, and Acetone

NORMAL PUMPING TEMP (DEG. F) 80 MAX 100

SPECIFIC GRAVITY @ NORMAL PUMPING TEMP 1

VAPOR PRESS @ NORMAL PUMPING TEMP (PSIA) 505

VISCOSITY @ NORMAL PUMPING TEMP 1cp

CORROSION CAUSED BY: _____

pH _____

DRIVER HP TO BE SELECTED FOR MAX SPECIFIC GRAVITY OF 1

AND MAX VISCOSITY OF 1cp

CAPACITY (US GPM): NORMAL max of 10 gpm and m/min RATED 17.5

DISCHARGE PRESS (PSIG) 85

SUCTION PRESS (PSIG): MAX _____ RATED _____

DIFFERENTIAL PRESS (PSI) _____

DIFFERENTIAL HEAD (FT) 196 NPSH AVAILABLE (FT) 28 ft

HYDRAULIC HP _____

MAX SITE TEMP (DEG. F) _____

MIN _____

MAXIMUM RELATIVE HUMIDITY (%) _____

MIN _____

LOCATION: ☐ INDOOR ☒ OUTDOOR

☐ HEATED

☒ UNHEATED

☐ ROOF

☐ SUN

ALTITUDE(FT) 0

ELEC AREA CLASSIFICATION: CLASS I

DIV 2

GROUP 0

CASE

MOUNT: ☐ FOOT ☐ CENTERLINE

TYPE VOLUTE: ☐ SINGLE ☐ DOUBLE

MAX ALLOWABLE PRESSURE (PSIG): _____

@ _____ DEG. F

HYDROSTATIC TEST AT (PSIG) _____

SUCTION NOZZLE: SIZE 1 1/2

RATING 150 #

TYPE FACING RF

LOCATION End

DISCHARGE NOZZLE: SIZE 1 1/2

RATING 150 #

TYPE FACING RF

LOCATION Top

MAXIMUM NOZZLE FORCES (LBS)

SUCTION: Fx _____ Fy _____ Fz _____

DISCHARGE: Fx _____ Fy _____ Fz _____

MAXIMUM NOZZLE MOMENTS (FT-LBS)

SUCTION: Mx _____ My _____ Mz _____

DISCHARGE: Mx _____ My _____ Mz _____

THERM - GROWTH (MILLS)

SUCTION: Dx _____ Dy _____ Dz _____

DISCHARGE: Dx _____ Dy _____ Dz _____

SKETCH ORIENTATION:

TYPE CASE: ☐ PLAIN ☐ FLANGED

☐ COATED FOR HEATING

☐ JACKETED FOR COOLING

BEARINGS

RADIAL: TYPE Ball

MFR & NO. SKF 6207

THRUST: TYPE Ball

MFR & NO. SKF 5306 A/C 3

LUBE: ☒ OIL ☐ OIL MIST

☐ GREASE

☐ ADAPTABLE TO OIL MIST

RECOMMENDED OIL SPECIFICATION: _____

TYPE OF OIL LUBRICATOR: _____

COUPLING

FURNISHED BY: _____

☒ PUMP MFR

☐ DRIVER MFR

☐ PURCHASER

TYPE _____ MFR Raymond Omega MODEL ES-4

COUPLING BORES (IN): PUMP _____

DRIVER _____

KEYWAYS(IN): PUMP _____

DRIVER _____

DRIVER HALF MOUNTED BY: _____

☒ PUMP MFR

☐ DRIVER MFR

☐ PURCHASER

AND FURNISHED BY: _____

☒ PUMP MFR

☐ DRIVER MFR

☐ PURCHASER

1	FORTIER PLANT HORIZONTAL CENTRIFUGAL PUMP DATA SHEET	JOB NO. <u>304258-EQ</u> ITEM NO.(S) <u>101-53</u> A-14
2		PURCHASE ORDER NO. _____
3		REQUISITION NO. _____
4		INQUIRY NO. _____
		PAGE <u>2</u> OF <u>3</u>

***** SUPPLIER COMPLETES ALL LINES MARKED X *****

PACKING

50	MFR _____	MODEL _____	CODE _____
51	NO. OF RINGS _____	SIZE _____	LANTERN RING: YES _____ NO _____

MECHANICAL SEAL

55	MFR <u>Dura-Metallic</u>	MODEL <u>RD-TT</u>	CODE _____
56	TYPE: _____ BALANCED <input checked="" type="checkbox"/> UNBALANCED <input checked="" type="checkbox"/> SINGLE <input checked="" type="checkbox"/> DOUBLE _____ INSIDE _____ <input checked="" type="checkbox"/> OUTSIDE _____ BACK TO BACK _____ TANDEM _____ FACE TO FACE _____		

OTHER CONSTRUCTION FEATURES

60	IMPELLER DIAMETER(IN):	RATED <u>7"</u>	MAX <u>8"</u>	TYPE <u>OPEN</u>	SHAFT: <input checked="" type="checkbox"/> SLEEVED _____ UNSLEEVED _____	
61	STUFFING BOX COVER:	<input checked="" type="checkbox"/> STANDARD _____ OVERSIZE BORE FOR MECHANICAL SEAL _____				

PUMP MATERIALS (include ASTM No.)

65	CASING <u>NOTE 1</u>	IMPELLER <u>NOTE 1</u>
66	WEAR RINGS _____	SHAFT _____
67	SLEEVE _____	GLAND _____
68	GASKETS _____	BASEPLATE _____
69	COUPLING GUARD _____	BEARING HOUSING _____
70	OTHER <u>NOTE 1: ALL WETTED PARTS ARE 316 SS</u>	

AUXILIARY PIPING (PLAN NUMBER AND CODES FROM ANSI B73.1M - 1984)

74	STUFFING BOX PIPING BY <u>N/A</u>	PLAN NO. _____	MATERIAL CODE _____
	C.W. PIPING BY _____	PLAN NO. _____	MATERIAL CODE _____
76	TOTAL COOLING WATER REQUIRED (GPM) _____		SIGHT GLASS REQUIRED (Y/N) _____
77	PACKING COOLING INJECTION REQUIRED, TOTAL GPM _____		PSIG _____
78	EXTERNAL SEAL FLUSH FLUID _____		GPM _____ PSIG _____
79	SEAL QUENCH PIPING BY _____ PLAN NO. _____ FLUID _____		

TAPPED OPENINGS (Refer to ANSI B73.1M - 1984 FIGURE A1)

	ANSI NO.	SIZE	QTY	PURPOSE	MARKING	REQ'D. (Y/N)	FUR'N'D. (Y/N)	USAGE*
0	I			CASING DRAIN				
1	II			DISCHARGE GAGE OR FLUSH CONNECTION				
2	III			SUCTION GAGE OF FLUSH CONNECTION				
3	IV			LANTERN RING OF MECHANICAL SEAL FLUSH				
4	V			MECHANICAL SEAL FLUSH AT FACES				
5	VI			STUFFING BOX COOLING/HEATING				
6	VII			FLUSH CONNECTION - MECHANICAL SEAL GLAND				
7	VIII			QUENCH CONNECTION FOR MECHANICAL SEAL				
8	IX			QUENCH CONNECTION FOR PACKED BOX				
9	X			OIL DRAIN				
10	XI			BEARING FRAME COOLING				
				CASING JACKET				

* USAGE CODES: A = PIPED BY MFR; B = PIPED BY USER; C = PLUGGED BY MFR; D = OPEN; E = OTHER

SOUND SPECIFICATION REQUIREMENTS

LESSER OF _____ SOUND POWER LEVEL @ 3 FT AND CURRENT OSHA SPECIFICATION

REV 1 DATE 6/20/77

Goulds Pumps Inc

11115 Industriplex Blvd. Suite 100
Baton Rouge, La. 70809
Phone (504) 296-5211
Fax (504) 296-5205
Richard A. Mulhearn
Application Engineer

15
A-16

20 June 1997

Cytec Industries Inc.

Inquiry No: Verbal

Proposal No: B04187RMKT05CA Rev.# 3

Item No : 1

MODEL: 3796 Size: 1.5x1.5-8 STX QTY: 1

Operating conditions

SERVICE	Water
LIQUID	Water & Various Chemicals
CAPACITY N/R	17.5 / 17.5 GPM (100 Deg F, 1.000 SP.GR 1.12 cp Viscosity)
HEAD	196.0 ft

Performance at 3600 RPM

PUBLISHED EFFY	15.0% (CDS)
RATED EFFY	14.0% with contract seal
RATED HP	6.2 (incl Mechanical seal drag 0.38) .Max at run out 13.0
NPSHR (ft)	7.0 (available NPSH is 28.0)
DISCH PRESSURE	84.8 PSI (89.6 @so) (Based on 0.0 PSI Suc.press)
PERF CURVE	2530-1 (Rotation CW viewed from coupling end)
SHUT OFF HEAD	207.0 ft
MIN FLOW	17.5 GPM

Prices in USD

Pump Unit	6,148
Testing	
Driver	658
Box. & Frt	
Total Unit	6,806

Materials

CASING	316SS max casing pres. @ rated temperature 265 psi
T.BOX COVER	316SS
IMPELLER	316SS -Open-Overhung (7.0000 rated (Inches) max= 8.0000 min= 6.0000)
SHAFT	SAE 4140
SHAFT SLEEVE	316SS
LUBRICATION	FLOOD OIL
BEARINGS	SKF 6207 (Radial) SKF 5306 A/C3 (Coupling end)
COUPLING	REYNORD OMEGA REX ELASTOMER- ES-4
COUPLING GRD	STEEL
BASE PLATE	FEATURE FAB.STEEL TO ANSI 1991 D06875A

Current motor frame is 254T. Baseplate is sized to accommodate 254T future motor size

Additional Pump Features

VERTICAL LEVELLING SCREWS
HORIZONTAL MTR ALIGNMENT SCREWS
IMPELLER-BALANCED TO ISO 1940 G2.5 LEVELS
STUFFING BOX-BACK DRILLED
SPECIAL FLANGES-150# RAISED FACE PER ANSI B16.5

Sealing Method

DESCRIPTION	DURA ROTT SINGLE OUTSIDE UNBALANCED SEAL E7SEPV
-------------	---

Documentation

4 SETS OF FINAL DATA

Driver Electric Motor

Manufacturer: GOULDS' CHOICE

A-17

FURNISHED BY **GOULDS**
 RATING **15.0 HP (11.2 KW)**
 PHASE/HZ/VOLTS **3/60/460**
 INSULATION/SF **F / 1.15**

MOUNTED BY **GOULDS**
 ENCLOSURE **TEFC CHEM DUTY CLASS 1 DIV 2 GRP D T2B**
 SPEED **3600 RPM**
 FRAME **254T**

Weights and Measurements

TOTAL NET UNIT WEIGHT/VOLUME
TOTAL GROSS UNIT WEIGHT/VOLUME

704 Lbs / 12.20 FT3
814 Lbs / 21.90 FT3



Goulds Model 3796 STX

60 Hz Performance Curve

725.4C4

December 31, 1993
(Sup. 8/14/91)Size: **1 1/2 x 1 1/2 - 8**Group: **STX**RPM: **3500**

Commercial Data

Customer Cytec Ind.

F.O. No. _____

P.O. No. _____

Item No. 101-53

Equip. No. _____

Service Lab Sample Pump

Date _____

Certified By _____

Technical Data

Liquid Water, MMA, Methanol, AcH & AcetoneTemp. 50/100 S.G. 1.0 Visc. 1cp

Max. Diam. Solids _____

Flow *17.5 TDH 19 1/2NPSH_a _____ NPSH_r _____Pump Minimum Flow 12.5 GPM *Impeller Diam. 7"

Pump Power _____

Power Consumption - Mech. Seal/Dyn Seal _____

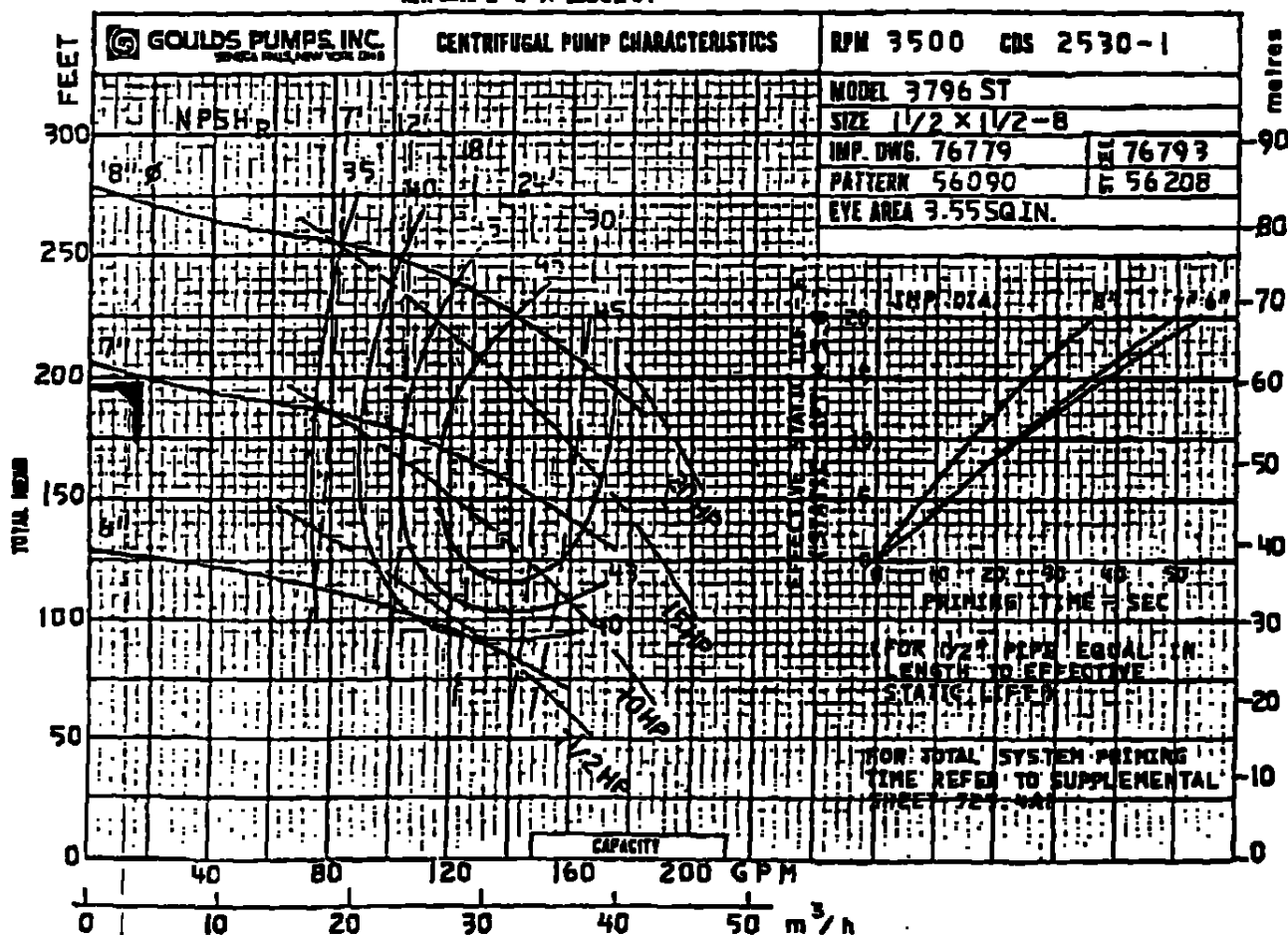
Other Power Losses _____

Rated Total Power _____

Rated Hydraulic Efficiency _____

DATE 5-24-77

REV. DATE 2-6-91 ISSUE #1



Requisition
Continuation
Sheet

CYTEC

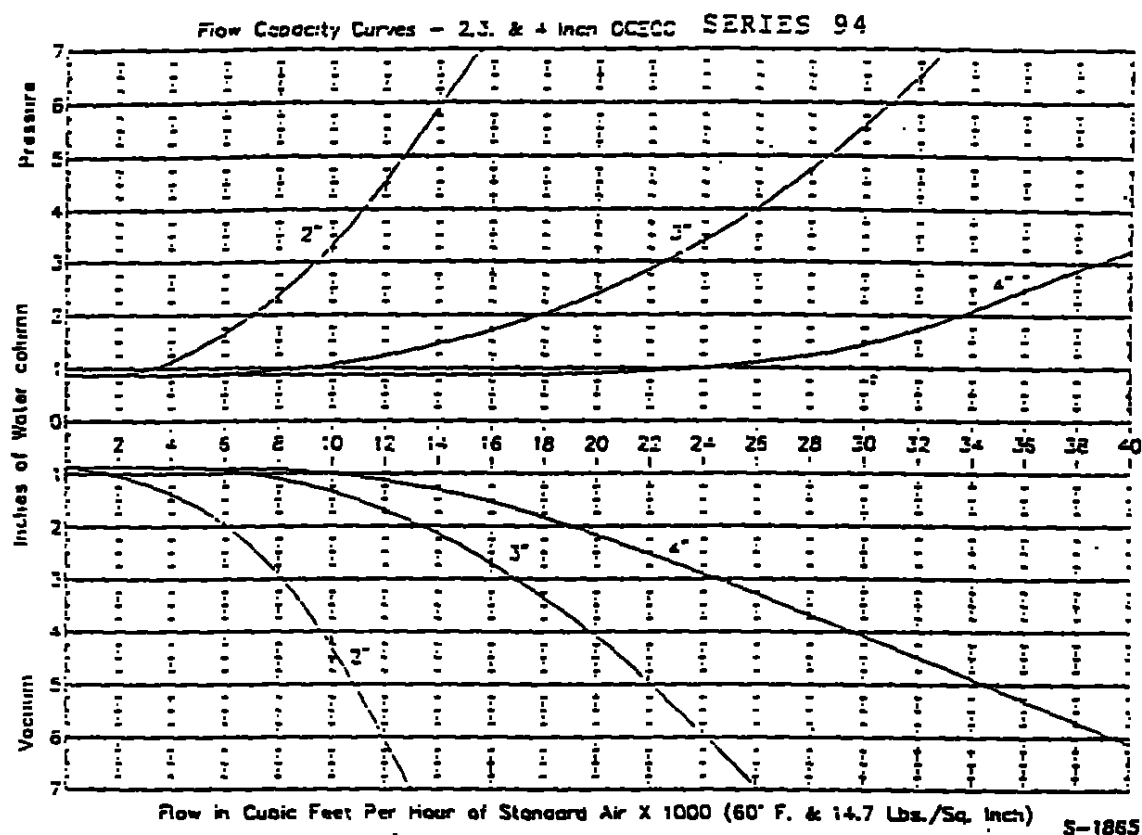
PRESSURE VACUUM VENT

SPECIFICATION SHEET

1 Tag Number		PSV-6502		
Material	2.	P & ID No	09-0-86	
		Size	2" 150# ANSI RF	
	3.	Lower Body	303 SS	
	4.	Hood	303 SS	
	5.	Upper body & Cover	303 SS	
	6.	Cover Gasket	TEFLON	
	7.	Stem & Guide Post	304 SS	
	8.	Patlet	304 SS	
	9.	Screen		
	10.	Seat	304 SS	
	11.	Flange Gasket & Disc		
	12.	Diaphragm	TEFLON	
	13.	Stem Guide	304 SS	
	14.	Pressure Set	3 INCHES W.C.	
	15.	Vacuum Set	0.5 OZ	
	16.	Manufacturer	OCECO	
	17.	Model	2R-PV094-PP1	

Notes: FURNISH STAINLESS STEEL TAG WITH TAG NO., SECURELY ATTACHED TO EACH INSTRUMENT.

11	10	9	8	7	6	5	4	3	2	1	0	NO.	ISSUE
											6/12/87	DATE	
											FFM	BY	
Specification Number PSV 6502					Job No.			Req. No.			Sheet No. 1 of 1 Sheets		



OCECO

Serving the Petroleum and Chemical Industries with quality tank fittings since 1894.

EXCELON® R-4000

a rigid pipe system for complete visibility and versatility

Clearly, the most practical system where visual control is required, Excelon R-4000 joins transparent, rigid PVC pipe and transparent Excelon fittings in a single system.

Excelon R-4000 is the only transparent schedule 40 PVC pipe available in 10' lengths. Pipe and fittings conform with schedule 40 for ease of specification and incorporation into existing systems.

Transparent Excelon adapter fittings permit direct incorporation of Excelon R-4000 pipe and fittings into systems of traditional plastic pipe materials. Excelon pipe may also be joined with standard gray Schedule 40 PVC fittings.

Developed by Thermoplastic Processes, Inc., this total approach to pipe installation combines visibility, durability and versatility at reasonable cost.

Lightweight and easy to handle, Excelon R-4000 pipe and fittings are designed for complete chemical and physical compatibility. The Excelon pipe system can be permanently installed with solvent cement.

The advantages of transparent rigid pipe and fittings enable the Excelon R-4000 pipe system to provide total visual control in the widest possible variety of situations. Excelon R-4000 can be employed in solid, liquid, semi-pneumatic and pneumatic systems.



Sight Gauge

The sight gauge, shown here, is one of many practical applications for clear fittings and pipe.

Non-toxic Excelon R-4000 resists bacterial activity and meets FDA and standards for sanitary use in food, drug and chemical processing.

Transparent PVC Excelon R-4000 is non-conductive and not subject to deterioration by corrosion. Smooth interior surfaces of pipe and fittings permit maximum flow rates and minimize accumulation of sediment.

Unique physical properties make Excelon R-4000 the ideal system where expansion and contraction conditions exist. Dimensional stability, high tensile and burst strength enable pipe and fittings to withstand variations in temperature and operating pressure.

An economical alternative to glass, pipe and other traditional materials, the Excelon R-4000 system fulfills a special need in a wide range of applications. Excelon R-4000 is recommended for consideration in food and pharmaceutical plants, laboratories, hospitals, electroplating and photo-finish systems, chemical and industrial installations wherever visual tracing is required or desirable.

An innovator in the field of thermoplastic extrusions, Thermoplastic Processes, Inc., adds Excelon R-4000 rigid pipe and fittings to the revolutionary EXCELON SYSTEM for rigid and flexible tubing and fittings. R-2000 rigid tube is available in 1/2" to 3" I.D. The tube is very compatible with the flexible R-1000 flexible fittings. They can be designed to meet the most compact requirements because non-standard bends and angles allow tubing to conform to any layout.

*See "Thermal Expansion and Contraction" Chart, Table 1000.

EXCELON R-4000	$\frac{PC}{VI} - \frac{N}{T} - \frac{N}{F} - \frac{C}{P}$	meets these standards of excellence
$\frac{PC}{VI}$		= meets or exceeds standards in Pharmacopeia XIX, Class VI, pages 544-547
$\frac{N}{T}$		= non-toxic, meets standards per FDA reg. 178.3790
$\frac{N}{F}$		= meets or exceeds standards in National Formulary, Vol. 14, pages 880-884, containers for injectables (plastics)
$\frac{C}{P}$		= clear pipe

Transparent PVC Pipe and Fittings

Excelon® R-4000 Rigid Pipe

An effective substitute for copper, stainless steel, glass and other traditional pipe materials, specify Excelon R-4000 wherever visibility and superior performance is essential.

Excelon R-4000 rigid schedule 40 pipe will withstand working pressures to 390 psi according to the pipe size selected.

Smooth interior pipe wall permits highest maximum flow rates and helps prevent accumulation of sediment in most applications. Excellent electrical and chemical characteristics. Excelon R-4000 is non-conductive and not subject to corrosion. A non-toxic FDA sanctioned compound.

Ideal for use in self-supporting systems where complete visual control is required, the Excelon R-4000 rigid pipe may be used to transport liquids, gases and, in some cases, solids.

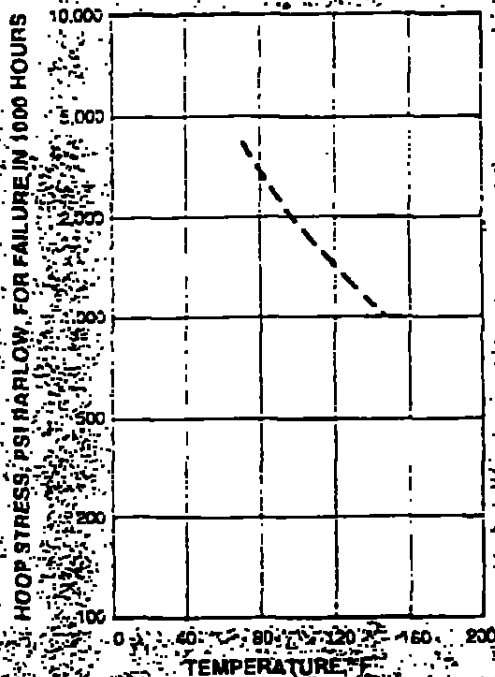
Excelon® R-4000 Rigid Fittings

Transparent Excelon R-4000 rigid fittings are designed for complete chemical and physical compatibility with Excelon R-4000 pipe.

Designed for optimum installation ease, outside diameter of pipe fits snugly into inside diameter of fitting socket. Excelon R-4000 fittings can be permanently joined to PVC pipe in simple steps using TPI cleaner, primer and solvent cement. Adapter fittings may be used to incorporate Excelon R-4000 pipe into existing systems. Applications include sight-glass gauges. Excelon R-4000 fittings are also available with threaded male or female adapters for use with other pipe materials.

Like Excelon R-4000 pipe, fittings can be cold sterilized in ethylene oxide and are flame retardant.

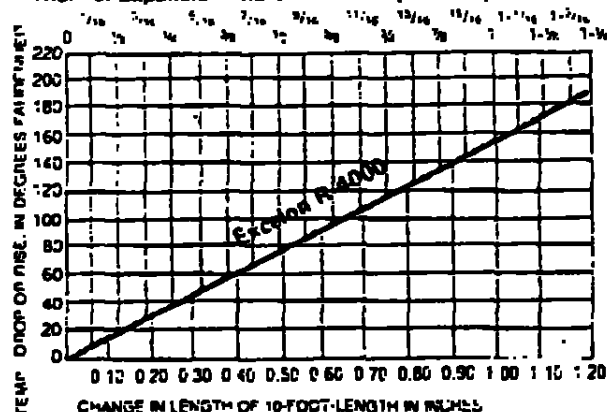
STRESS-TEMPERATURE CHARACTERISTIC CURVE



Excelon R-4000 Typical Properties

Appearance	clear pellets
Bulk Density, lbs./cu. ft.	48.0
Volatile Matter % max.	0.25
Specific Gravity	1.33
Rockwell Hardness, R Scale	109
Shore "D" Hardness	81
Heat Distortion Temperature, °F @ 264 psi	135
Tensile Strength, psi	7300
Modulus of Elasticity in Flexure, psi	4.4×10^5
Flexural Strength, psi	13,400
Light Transmission % 33.5 mils @ 400 μ	70
Light Transmission % 33.5 mils @ 700 μ	81
Izod Impact, ft.-lbs./in. notch	0.95
Flammability	self extinguishing

Thermal Expansion and Contraction (all sizes)







EXCELON R-4000 RIGID PIPE STANDARD SIZES AND WORKING PRESSURES


ITEM NO.	STOCK NO.	NOMINAL PIPE SIZE (IN.)	AVERAGE I.D.	O.D.	LBS MFT.	MAX W.P. PSI
4301	R4-250	1/2"	.344	.540	76	300
4302	R4-375	3/4"	.473	.675	102	240
4303	R4-500	1"	.502	.840	152	200
4304	R4-750	1 1/2"	.804	1.050	202	170
4305	R4-1000	2"	1.029	1.315	300	150
4306	R4-1250	2 1/2"	1.360	1.680	406	120
4307	R4-1500	3"	1.590	1.900	486	100
4308	R4-2000	4"	2.047	2.375	653	80
4309	R4-2500	5"	2.445	2.875	1035	60
4310	R4-3000	6"	3.042	3.500	1353	50
4311	R4-3500	8"	3.521	4.000	1721	40
4312	R4-4000	10"	3.996	4.500	2025	30
4316	*R4-6000	12"	6.375	6.625	1550	25

Standard length 10 ft.

* This size does not comply with schedule 40 as to I.D., wall thickness, and pressure.

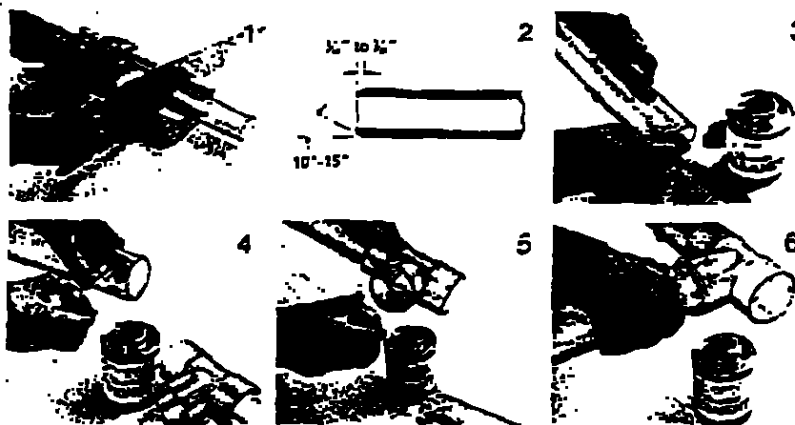
EXCELON R-4000 RIGID FITTING STANDARD SIZES AND WORKING PRESSURES

DESCRIPTION	STOCK NO.	ACCEPTS NOM. PIPE SIZE	MAX. W.P. PSI
90° ELL  TYPE 10 - SLIP X SLIP	432001 432002 432003 432005 432006	1/2" 3/4" 1" 1 1/2" 2"	300 240 220 170 140
TEE  TYPE 110 - SLIP X SLIP X SLIP	432111 432112 432113 432115 432116	1/2" 3/4" 1" 1 1/2" 2"	300 240 220 170 140
SLIP COUPLING  TYPE 210 - SLIP X SLIP	432301 432302 432303 432305 432306	1/2" 3/4" 1" 1 1/2" 2"	300 240 220 170 140
FEMALE ADAPTER  TYPE 220 - SLIP X FPT	432316 432317 432318 432320 432321	1/2" 3/4" 1" 1 1/2" 2"	300 240 220 170 140

DESCRIPTION	STOCK NO.	ACCEPTS NOM. PIPE SIZE	MAX. W.P. PSI
MALE ADAPTER  TYPE 240 - SLIP X MPT	432336 432337 432338 432340	1/2" 3/4" 1" 1 1/2" 2"	300 240 220 170 140

NOTE: Large Sizes and Fittings Configurations not listed will be Quoted Upon Request.

solvent cementing instructions



(1) Excelon R-4000 pipe can be cut easily using hand saw and must be cut using cutter. (2) Chamfer pipe ends according to dimensions diagrammed. (3) Apply TP R-4001 Cleaner to inside of fitting socket and to pipe end. Be sure pipe and fitting are free of dirt, moisture and grease. (4) Using liberal coats of TP R-4002 Primer, prime inside of fitting socket and outside surface of pipe to depth of socket. (5) TP R-4003 Cement should then be applied immediately to primed pipe surface. A lighter coat is applied to inside of fitting socket and a final second coat to the pipe end. (TP R-4003 Cement meets ASTM Standard D2564 and is NSF approved File # 1555.) (6) While both surfaces are wet and soft, push and twist pipe into socket and hold together until both surfaces are firm (about 30 seconds). Allow joint to cure before pressure testing.

A-24

economical application, clearly superior performance

Tested in accordance with FDA regulation #178.3790, "extracts obtained were sufficiently low to permit the Excelon R-4000 compound to be used for most food contact applications". (Subject to the conditions stipulated in that section.)

The Excelon R-4000 compound meets both ingredient and extraction requirements to be used in contact with the following type foods:

- I Nonacid, aqueous products; may contain salt or sugar or both (pH above 5.0).
- II Acidic, aqueous products; may contain salt or sugar or both, and including oil-in-water emulsions of low or high fat content.
- III Aqueous, acid or nonacid products containing free oil or fat; may contain salt, and including water-in-oil emulsions of low or high fat content.
- IV Dairy products and modifications.
 - A Water-in-oil emulsions, high or low fat.
 - B Oil-in-water emulsions, high or low fat.
- V Low moisture fats and oils.
- VI Beverages
 - A Containing alcohol.
 - B Nonalcoholic.
- VII Bakery products.
- VIII Dry solids with the surface containing no free fat or oil (no end test required).
- IX Dry solids with the surface containing free fat or oil.

Excelon R-4000 rigid PVC pipe and fittings may be used under these exacting conditions:

- A. Hot filled or pasteurized below 135°F.
- B. Room temperature filled and stored (no thermal treatment in the container).
- C. Refrigerated storage (no thermal treatment in the container).
- D. Frozen storage (no thermal treatment in the container).

Users of Excelon R-4000 pipe and fittings have sole responsibility for familiarity and compliance with all conditions and limitations as set by the FDA.

Thermoplastic Processes, Inc., assumes no responsibility for such compliance. However, details on conditions of use for a broad spectrum of applications are available from the engineering department of Thermoplastic Processes, Inc.

use Excelon®R-4000 where quality counts

laboratories

Excelon R-4000 is qualified to handle a wide range of chemicals (See chemical resistance table). Excelon R-4000 compound is UL rated 94 VO.

food and pharmaceutical processing

Excelon R-4000 complies with FDA Regulation 175.300, 175.2650 and 178.3790 for use in contact with food. Non-toxic. Outperforms stainless steel and glass in many cases. Pipe and fittings available for use in sight-glass gauge applications.

chemical processing

Excelon R-4000 resists strong oxidizing and reducing acids. Resistant to mineral oils. Superior electrical characteristics.

photofinishing systems

Highest efficiency of flow rate plus visual control. Excelon R-4000 will not interact chemically with most solutions.

electroplating

Complete visual control and effective protection. Excelon R-4000 is non-conductive. Excelon R-4000 compound is UL rated 94 VO.

(Boiled 227 F. 140 F)

ACETIC ACID, 10%
ACETIC ACID, 30%
ACETYLENE
ADIPIC ACID
ALUM
ALUMINUM ALUM
ALUMINUM CHLORIDE
ALUMINUM FLUORIDE
ALUMINUM HYDROXIDE
ALUMINUM
OXYCHLORIDE
ALUMINUM NITRATE
ALUMINUM SULFATE
AMMONIA (GAS-FR)
AMMONIUM ACETATE
AMMONIUM ALUM
AMMONIUM BIFLUORIDE
AMMONIUM
CARBONATE
AMMONIUM CHLORIDE
AMMONIUM HYDROXIDE
AMMONIUM
HYDROXIDE, 10%
AMMONIUM
HYDROXIDE, 28%
AMMONIUM
MAGNESIUM PHOSPHATE
AMMONIUM NITRATE
AMMONIUM
PERMANGANATE
AMMONIUM PHOSPHATE
AMMONIUM SULFATE
AMMONIUM SULFATE
AMMONIUM
THIOCYANATE
ANTHRAQUINONE SULFONIC
ACID
ANTIMONY
TRIOXIDE
ARSENIC ACID, 50%
BARIUM CARBONATE
BARIUM CHLORIDE
BARIUM HYDROXIDE
BARIUM SULFATE
BARIUM SULFIDE
BEEF
BEEF SUGAR LIQUORS
BENZOIC ACID
BISMUTH CARBONATE
BLACK LIQUOR
BLEACH (12% CL)
BORAX
BORIC ACID
BREEDERS PELLETS
(high germ level)
BROMIC ACID
CADMIUM CYANIDE
CALCIUM BISULFIDE
CALCIUM BISULFITE
CALCIUM CARBONATE
CALCIUM CHLORIDE
CALCIUM HYDROXIDE
CALCIUM
HYPOCHLORITE
CALCIUM NITRATE
CALCIUM SULPHATE
CARBON DIOXIDE
CARBON MONOXIDE
CARBONIC ACID
CASTOR OIL
CAUSTIC POTASH
CAUSTIC SODA
CHLORAL HYDRATE
CHLORIC ACID, 20%
CHLORIDE WATER
CHLORINE WATER
CHROME ALUM
CHROMIC ACID
COPPER CARBONATE
COPPER CHLORIDE
COPPER CYANIDE
COPPER FLUORIDE

COPPER NITRATE
 CORN SYRUP
 COPPER SULFATE
 CREAMED GLASS
 CUPRIC FLUORIDE
 CUPRIC SULFATE
 CUPRUS CHLORIDE
 JET FUELS
 DEXTRANS
 DIAZO SALTS
 DIGLYCOLIC ACID
 DISODIUM PHOSPHATE
 DISTILLED WATER
 ETHYLENE GLYCOL
 FATTY ACIDS
 FERRIC CHLORIDE
 FERRIC HYDROXIDE
 FERRIC NITRATE
 FERRIC SULFATE
 FERROUS CHLORIDE
 FERROUS SULFATE
 FISH SOLUBLES
 FLUORIC ACID
 FLUORINE GAS (NET)
 FLUOROLIC ACID
 25%
 FRUCTOSE
 FRUIT JUICES & PULP
 GLACIAL ACETIC ACID
 GLUCOSE
 GLYCERINE
 GLYCOL
 GLYDOLIC ACID
 GRAPESUGAR
 HYDROBROMIC ACID
 20%
 HYDROCHLORIC ACID
 10%
 37%
 36%
 HYDROCYANIC ACID
 HYDROGEN
 HYDROGEN PEROXIDE
 30%
 50%
 80%
 HYDROGEN SULFIDE
 HYDROQUINONE
 HYDROXYLAMINE
 SULFATE
 HYPOCHLORIC ACID
 HYPOCHLOROUS ACID
 KEROSENE
 KRAFT LIQUORS
 LACTIC ACID, 25%
 LAURIC ACID
 LEAD ACETATE
 LEAD CHLORIDE
 LEAD BIA FATE
 LENTIC ACID
 LIQUID OIL
 LITHIUM BORATE
 LUBRICATING OIL
 ASTM #1
 ASTM #2
 MACHINE OIL
 MAGNESIUM
 CARBONATE
 MAGNESIUM CHLORIDE
 MAGNESIUM
 HYDROXIDE
 MAGNESIUM NITRATE
 MAGNESIUM SULFATE
 MALEIC ACID
 MALIC ACID
 MANUFACTURED GAS
 MERCURIC CHLORIDE
 MERCURIC CYANIDE
 MERCURIUS NITRATE
 MERCURY

METHYL ALCOHOL
METHYL SULFURIC ACID
MILK
MELANINES
MURIATIC ACID
NATURAL GAS
NICKEL CHLORIDE
NICKEL NITRATE
NICKEL SULPHATE
NICOTINE
NICOTINE ACID
NITROUS OXIDE
OILS & FATS
OL. SOUP CRUDE
OLEIC ACID
OXALIC ACID
OXYGEN
OZONE
PALMITIC ACID 10%
PERCHLORIC ACID 10%
PETROLEUM LIQUIFIER
PHOSGENE GAS
PHOSPHORIC ACID 10%
PHOSPHORIC ACID 25%
PHOSPHORIC ACID 75%
PHOSPHORIC ACID 85%
PHOTO. SOLUTIONS DX
F
DEKAL DEVELOPER
KODAK FIXER
KODAK SHOT S13P
POTASSIUM ALUM
POTASSIUM
BICARBONATE
POTASSIUM
BICHROMATE
POTASSIUM BORATE
POTASSIUM BROMATE
POTASSIUM BROMIDE
POTASSIUM
CARBONATE
POTASSIUM CHROMATE
POTASSIUM CHLORATE
POTASSIUM CILORATE
POTASSIUM CYANIDE
POTASSIUM
DICHROMATE
POTASSIUM
L-ASCORBIC ACID
POTASSIUM
PERIODIC ACID
POTASSIUM FLUORIDE
POTASSIUM HYDROXIDE
POTASSIUM NITRATE
POTASSIUM
PERBORATE
POTASSIUM
PERCHLORATE
POTASSIUM
PERMANGANATE 10%
POTASSIUM SULFATE
PROPANE
PROPANE GAS
PLATING SOLUTIONS
BRASS
CADMIUM
COPPER
GOLD
INDIUM
LEAD
NICKEL
RHODIUM
SILVER
TIN
ZINC
RAYON COAGULATING
BATH
SEA WATER
LEWIS ACID
SILICIC ACID
SILVER CYANIDE
SILVER NITRATE
SILVER PLATING
SOLUTION
SILVER SULFATE
SILVER

SODIUM ACETATE
SODIUM ALUM
SODIUM BENZOATE
SODIUM BICARBONATE
SODIUM BISULFATE
SODIUM BISULFITE
SODIUM BROMIDE
SODIUM CARBONATE
SODIUM CHLORIDE
SODIUM CHLORIDE
SODIUM CYANIDE
SODIUM DIPHOSPHATE
SODIUM FERRICYANIDE
SODIUM
FERROCYANIDE
SODIUM FLUORIDE
SODIUM HYDROXIDE
30%
50%
SODIUM
HYPOCHLORITE
SODIUM NITRATE
SODIUM SULFATE
SODIUM SULFIDE
SODIUM SULFITE
SOUR CRUDE OIL WEST
TEXAS
STANNIC CHLORIDE
STANNOUS CHLORIDE
STARCH
STEARIC ACID
SULFUR
SULFUR DIOXIDE 100%
SULFUR TRIOXIDE
SULFURIC ACID 30%
10%
20%
30%
50%
70%
SULFURIC ACID
TAN OIL
TANNIC ACID
TARTARIC ACID
TANNING LIQUORS
TRISODIUM PHOSPHATE
UREA
URINE
VINEGAR
WATER, AROMATIC
WATER DEIONIZED
WATER
DEMINERALIZED
WATER, DISTILLED
WATER, FRESH
WATER SALT
WHISKEY
WHITE LIQUOR
WINES
ZINC CHLORIDE
ZINC SULFATE
ZINC NITRATE

LUBRICATING OIL
ASTM #3
METHYL SULFATE
NAPHTHA
NITRIC ACID 10%
NITRIC ACID 30%
NITRIC ACID 50%
PHENYLCHLORAZINE
HYDROCHLORIDE
DIOXOBORUS
IVE LOW
PHOSPHORUS
PENTHOXIDE
ACETASULPH
PERMANGANATE 25%
(1) 15%
BROMATE, ALCOHOL
PROPYL ALCOHOL
TETRAETHYLENE
TRIMETHANOLAMINE
TRIMETHYL PROPANE

ACETALDEHYDE

ACETALDEHYDE
ACETIC ACID, PURE
ACETIC ACID 8%
ACETIC ACID (IN ACIAL)
ACETIC ANHYDRIDE
ACETONE
ALLYL ALCOHOL 96%
ALLYL CHLORIDE
AMMONIA (LIQUID)
AMMONIUM FLUORIDE
25%
ANIL ACETATE
ANIL & COMOL
ANIL CYCLOPENTANE
ANILINE
ANIL IN:
C-6 CRYSTAL
ANILINE
HYDROCHLORIDE
AQUA REGIA
AROMATIC
HYDROCARBONS
HEXAZO DEHYDE 10%
HEXAZO DEHYDE ABOVE
10%
RFAZENE
BROMINE LIQUID
BROMINE WATER
BUTADIENE
BUTANOL
BUTANOL PRIMARY
BUTANOL SECONDARY
BUTYL ACETATE
BUTYRIC DIC.
BUTYRIC ACID
CARBON BISULFIDE
CARBON
TETRACHLORIDE
CHLORINE (DIHY)
CHLORINE GAS
CHLORINE GAS (NIT)
CHLOROBENZENE
CHLOROFORM
CHLORIC ACID 10%
CHLORIC ACID 50%
CHLOROX
CROTOALDEHYDE
CYCLOHEXANOL
CYCLOHEXANONE
DICYCLIMYLAMINE
DICYCLOMETHYLENE
ESTERS
ETHERS
ETHYL ACETATE
ETHYL ACRYLATE
ETHYL CHLORIDE
ETHYL ETHER
ETHYLENE BROMIDE
ETHYLENE
CHLOROFORM

[illegible]

(15.72F)

[illegible]

Since working pressures, physical and chemical properties are based on individual laboratory and test reports and are accurate to the best of our knowledge, our guarantees are expressed in terms of

Unless specified GMA is based on 70°F room temperature. Refer to Data Sheet for additional specifications. When ordering please indicate type of film and roll number.

Liability Clause

LIABILITY
THERMOPLASTIC PROCESSES, INC., hereinafter called the "MANUFACTURER" warrants that its products shall be free from defects in workmanship and materials. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES FOR FITNESS FOR PURPOSE INTENDED. The MANUFACTURER'S liability is limited to the replacement of any materials which, after an examination by the MANUFACTURER and at its sole option, are found to be defective. The MANUFACTURER will honor only those claims which are presented to it within thirty (30) days of the delivery of the materials to the purchaser. THE MANUFACTURER SPECIFICALLY DISCLAIMS ANY AND ALL LIABILITY FOR CONSEQUENTIAL DAMAGES.

THIS LITERATURE SUPERSEDES ALL PREVIOUS LITERATURE AND THE RESPONSIBILITIES MADE THEREON



THERMOPLASTIC PROCESSES, INC.

VALLEY ROAD, STIRLING, NEW JERSEY 07980

908-753-2115 • FAX 908-753-6749 • 908-561-3000

FAX 1-800-674-3291



CYTEC

PIPING MATERIALS SPECIFICATION

S4D15

REPLACES STANDARD(S): BADGER: 402H: FO15A7 (ACH)

PRIMARY PIPE MATERIAL: STAINLESS STEEL SEAMLESS, A312 Gr.TP 316L

PRIMARY FLANGE RATING: CLASS 150

PAGE: 1 of 2

DESIGN, CONSTRUCTION & INSPECTION: ASME B31.3, CATEGORY M (SEE NOTES BELOW) C.A.: 0.000

ITEM	SIZE (NPS)		RATING AND TYPE	NOTE	MATERIAL (or MANUFACTURER)
	FROM	THRU			
PIPE	1/2	3/4	Sch. 40S, SS, SEAMLESS, PE		A312 Gr.TP 316L
	1	24	Sch. 10S, SS, SEAMLESS, BE		A312 Gr.TP 316L
NIPPLES	ALL	-	USE WELDED JOINTS		
FITTINGS	1/2	24	Sch. TO MATCH PIPE, BW, PER ASME B16.9	1	ASTM A403 WP 316L WPS OR WPWX
UNIONS	ALL	-	USE FLANGES		
FLANGES	1/2	24	CLASS 150, SS, RF, WN, BORE TO MATCH PIPE, PER ASME/ANSI B16.5		ASTM A182 WP316L
GASKETS	ALL	-	1/16" RING FOR CLASS 150		GRAFOIL GHE
BOLTING	ALL	-	STUD BOLTS		ASTM A193 Gr.B8M CL2
			HEAVY HEX NUTS		ASTM A194 Gr.8M
JOINTS	ALL	-	DESIGN, CONSTRUCTION AND INSPECTION SHALL BE PER ASME B31.3 CATEGORY M	2	
INST CONN. PRESSURE TEMPERATURE					
BRANCH CONNECTION	-	-	SEE BRANCH CHART PAGE 2 OF 2	2	
VALVES			SEE SELECTED VALVE LIST ATTACHED.		

NOTES:

- MITER ELBOWS EXCEPT AS ALLOWED BY ASME B31.3 PARA. M306.3 SHALL NOT BE USED.
- ALL WELDS SHALL BE 20% RADIOGRAPHED WITH THE EXCEPTION OF WELDS ON A/N EXPANSION PROJECT CB-6002 WHICH REQUIRE 100% RADIOGRAPH.
- NO STAGNANT OR POCKETS ALLOWED IN PIPE RUNS. HORIZONTAL RUNS SHALL HAVE 3/16" SLOPE PER FOOT.

LIMITS	
PSIG	DEG. F
230	-20 to 100
175	300
160	400
150	450

ORIG. ISSUE: 3/24/93
 DATE: 10/04/95 REV: 3
 APPROVED: *[Signature]*

REQUIREMENTS: (continued)


PAGE: 2 of 2

NOTE

HEADER	B	R	A	N	C	H	C	O	N	N	E	C	T	I	O	N
SIZE	1/2	3/4	1	1-1/2	2	3	4	6	8	10	12	14	16	18	20	24
1/2	BWT															
3/4	BWRT	BWT														
1	WOL	BWRT	BWT													
1-1/2	WOL	WOL	BWRT	BWT												
2	WOL	WOL	WOL	BWRT	BWT											
3	WOL	WOL	WOL	WOL	BWRT	BWT										
4	WOL	WOL	WOL	WOL	WOL	BWRT	BWT									
6	WOL	WOL	WOL	WOL	WOL	WOL	BWRT	BWT								
8	WOL	WOL	WOL	WOL	WOL	WOL	WOL	BWRT	BWT							
10	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	BWRT	BWT						
12	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	BWRT	BWT					
14	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	BWRT	BWT				
16	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	BWRT	BWT			
18	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	BWRT	BWT		
20	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	BWRT	BWT	
24	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	BWRT	BWT

- NOTE:
1. WELDOLETS BORE TO MATCH BRANCH PIPE BORE.
 2.
 - BWRT - BUTT WELD REDUCING TEE
 - BWTR - BUTT WELD TEE WITH REDUCER
 - BWT - BUTT WELD TEE
 - BWT - SOCKET WELD TEE
 - BWRT - SOCKET WELD REDUCING TEE
 - SET - SCREWED TEE
 - SEWT - SCREWED REDUCING TEE
 - SI - STUB-IN
 - WOL - WELDOLET

NOTES:

LIMITS	
PSIG	DEG. F
230	-20 to 100
175	300
160	400
150	450
ORIG. ISSUE: 3/24/83	
DATE: 10/04/85	REV: 3
APPROVED: 	

ABBREVIATED VALVE DESCRIPTIONS
FOR PIPING MATERIAL SPECIFICATION

10/04/95

		*** S4D15 ***			
ITEM	VALVE				
NO	CODE	SIZE	RANGE	VALVE	

1	CH120A	3"	24"	CHECK VALVE CLASS 150 WAFFER TYPE	316 STAINLESS STEEL RF/WAFER
2	CH121A	1/2"	2"	CHECK VALVE CLASS 800 WELDED BONNET, BALL TYPE	316L STAINLESS STEEL SW
3	CH122A	1/2"	2"	CHECK VALVE CLASS 150 WELDED BONNET, PISTON TYPE	316 STAINLESS STEEL RF
4	CH451A	2-1/2"	24"	CHECK VALVE CLASS 150 HORIZONTAL, BOLTED BONNET, SWING TYPE	316 STAINLESS STEEL RF
5	CH452A	1/2"	2"	CHECK VALVE CLASS 150 HORIZONTAL, BOLTED BONNET, SWING TYPE	316 STAINLESS STEEL RF
6	GA122A	1/2"	1"	GATE VALVE CLASS 800 WELDED BONNET, OS&Y, BOLTED GLAND, SOLID WEDGE	316 STAINLESS STEEL SW/THRD HANDWHEEL OPERATOR
7	GA123A	1/2"	2"	GATE VALVE CLASS 800 MALE PLAIN END X FEMALE NPT, WELDED BONNET, OS&Y	316 STAINLESS STEEL PL/THRD OVAL/ROUND HANDLE
8	GA124A	1/2"	2"	GATE VALVE CLASS 800 WELDED BONNET, OS&Y	316 STAINLESS STEEL SW/THRD OVAL/ROUND HANDLE
9	GA125A	1/2"	2"	GATE VALVE CLASS 800 WELDED BONNET, OS&Y	316 STAINLESS STEEL SW OVAL/ROUND HANDLE

ABBREVIATED VALVE DESCRIPTIONS
FOR PIPING MATERIAL SPECIFICATION

10/04/95

		*** 84D15 ***				
ITEM	VALVE					
NO	CODE	SIZE	RANGE	VALVE		

10	GA135A	1/2"	24"	GATE VALVE CLASS 150 BOLTED BONNET, OS&Y, SOLID WEDGE	RF	316 STAINLESS STEEL GEAR OPERATOR
11	GA146A	1/2"	2"	GATE VALVE CLASS 150 OS&Y, BOLTED BONNET, SOLID WEDGE, RISING STEM	RF	316 STAINLESS STEEL HANDLE OPERATOR
12	GA153A	1/2"	24"	GATE VALVE CLASS 150 BOLTED BONNET, OS&Y	RF	316 STAINLESS STEEL HANDLE OPERATOR
13	GA233A	3"	12"	GATE VALVE CLASS 150 OS&Y, BOLTED BONNET, SOLID WEDGE	RF	316 STAINLESS STEEL HANDWHEEL OPERATOR
14	GL122A	10"	12"	GLOBE VALVE CLASS 150 BOLTED BONNET, OS&Y	RF	316 STAINLESS STEEL GEAR OPERATOR
15	GL125A	1/2"	2"	GLOBE VALVE CLASS 800 WELDED BONNET, OS&Y	SW	316L STAINLESS STEEL OVAL/ROUND HANDLE
16	GL421A	1/2"	12"	GLOBE VALVE CLASS 150 OS&Y, BOLTED BONNET, SWIVEL PLUG TYPE DISC	RF	316 STAINLESS STEEL OPERATOR: MFG'S STD
17	PL415A	1/2"	18"	PLUG VALVE CLASS 150 NON-LUBRICATED, PTFE SLEEVED	RF	316 STAINLESS STEEL WRENCH OPERATOR

ACH Laboratory Waste System

Estimated Waste Composition:

Moisture Meter Carboy

One day's lab work generates the following:

<u>Component</u>	<u>Quantity (ml)</u>
Methyl Methacrylate (MMA)	1650
Acetone Cyanohydrin (ACH)	14
Methanol	1680
Hydranal #2	1500
Hydranal #5	950
Waste Acid	16
Acetone	2
Estimated Total	5812

Acidity Carboy

One day's lab work generates the following:

<u>Component</u>	<u>Quantity (ml)</u>
Methyl Methacrylate (MMA)	1100
Acetone	50
Methanol	1150
Sodium Hydroxide (0.02 N)	46
Water	460
Estimated Total	2806

ACH Laboratory Waste System (Continued)

ACH Lab Work

One day's lab work generates the following:

<u>Component</u>	<u>Quantity (ml)</u>
Nitric Acid (1.0 N)	11
Silver Nitrate (0.1 N)	325
Ferric Alum (10%)	11
Distilled Water	15405
Potassium Thiocyanate (0.1 N)	209
Hydroxylamine Hydrochloride (0.1 N)	1500
Sodium Hydroxide (0.1 N)	405
Potassium Iodide (10%)	4
Methanol	233
Hydranal #5	10
Acetone Cyanohydrin	2000
Sump Water	1000

Estimated Total	21113
------------------------	--------------

Water Flow in Lab Hood Sink:

Potable water from sink flush:

800 ml/min x

60 min/hr x

24 hr/day = 1152000 ml/day

ACH Laboratory Waste System (Continued)

Estimated total daily quantities and composition:

<u>Component</u>	<u>Total Daily Quantity (ml)</u>	<u>% Concentration</u>
Methyl Methacrylate (MMA)	2750	0.2327%
Acetone Cyanohydrin (ACH)	2014	0.1704%
Methanol	3063	0.2592%
Hydranal #2	1500	0.1269%
Hydranal #5	960	0.0812%
Waste Acid	16	0.0014%
Acetone	52	0.0044%
Sodium Hydroxide (0.02 N)	46	0.0039%
Nitric Acid (1.0 N)	11	0.0009%
Silver Nitrate (0.1 N)	325	0.0275%
Ferric Alum (10%)	11	0.0009%
Potassium Thiocyanate (0.1 N)	209	0.0177%
Hydroxylamine Hydrochloride (0.1 N)	1500	0.1269%
Sodium Hydroxide (0.1 N)	405	0.0343%
Potassium Iodide (10%)	4	0.0003%
Water	1168865	98.9113%

Estimated Total	1181731
------------------------	----------------

APPENDIX B

Design Review Documentation and Calculations

APPENDIX B

Design Review Documentation and Calculations

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
Linder Tank Vent Capacity Calculations Dated 8-21-97	B-1
Linder Secondary Containment Vault Capacity Calculations Dated 8-22-97	B-4
Linder Vessel Minimum Shell Thickness Calculation Dated 12-8-97	B-6



Client: Cytec Industries
 Location: Westwego, LA
 Item: ACH Lab Waste Disposal
 System

Job No.: 97-2025M06
 Date: August 21, 1997
 By: THW
 Page: 1 of 3

TANK VENT CAPACITY CALCULATIONS

References: API 2000 *Venting Atmospheric and Low-Pressure Storage Tanks*

Cytec Drawing No. 09-0-86 Issue 5 *ACH Stock Tanks and Wastewater System*

Louisiana Maintenance Services Drawing No. 221 Rev. 2 *18" OD Lab Collection Tank*

Goulds Pump Model 3796STX Performance Curve 725.4C4 for 1-1/2 x 1-1/2 x 8 at 3500 rpm.

Oceco Flow Capacity Data for Series 94 Pressure/Vacuum Conservation Vents

SYSTEM DATA:

Tank Type:	Horizontal	
Tank Diameter:	D = 18-in	
Tank Length:	L = 3-ft + 1.25-in	(maximum length including dished head)
Maximum Tank Fill Rate:	Fill = $10 \cdot \frac{\text{gal}}{\text{min}}$	(assume 5 gal. carboy dumped in sink)
Max. Tank Emptying Rate:	Empty = $180 \cdot \frac{\text{gal}}{\text{min}}$	(conservative assumption - no back pressure on pump)

CALCULATIONS:

Tank Capacity:	Cap = $\pi \cdot \frac{D^2}{4} \cdot L$	Cap = 41 gal	(conservative overestimation - actual capacity 40 gal.)
Tank Surface Area:	Area _{shell} = $\pi \cdot D \cdot L$	Area _{shell} = 14.6 ft ²	
	Area _{fhead} = $\frac{\pi \cdot D^2}{4}$	Area _{fhead} = 1.8 ft ²	
	Area _{dhead} = $1.25 \cdot \frac{\pi \cdot D^2}{4}$	Area _{dhead} = 2.2 ft ²	

$$\text{Area}_{\text{tank}} = \text{Area}_{\text{shell}} - \text{Area}_{\text{fhead}} + \text{Area}_{\text{dhead}}$$

$$\text{Area}_{\text{tank}} = 18.6 \text{ ft}^2$$



Client: Cytec Industries
 Location: Westwego, LA
 Item: ACH Lab Waste Disposal
 System

Job No.: 97-2025M06
 Date: August 21 1997
 By: THW
 Page: 2 of 3

TANK VENT CAPACITY CALCULATIONS (Continued)

CAPACITIES REQUIRED:

Inbreathing (Vacuum Relief):

Liquid Movement: Inbreathing liquid = Empty $5.6 \cdot \frac{\text{ft}^3}{\text{hr}} \cdot 42 \cdot \frac{\text{gal}}{\text{hr}}$

$$\text{Inbreathing liquid} = 1440 \cdot \frac{\text{ft}^3}{\text{hr}}$$

Thermal Inbreathing: Inbreathing thermal = $60 \cdot \frac{\text{ft}^3}{\text{hr}}$ (from API 2000 Table 2)

Total Inbreathing: Inbreathing total = Inbreathing liquid + Inbreathing thermal

$$\text{Inbreathing total} = 1500 \cdot \frac{\text{ft}^3}{\text{hr}}$$

Normal Outbreathing (Pressure Relief): (Boiling point of tank contents <300 F)

Liquid Movement: Outbreathing liquid = Fill $12 \cdot \frac{\text{ft}^3}{\text{hr}} \cdot 42 \cdot \frac{\text{gal}}{\text{hr}}$

$$\text{Outbreathing liquid} = 171.4 \cdot \frac{\text{ft}^3}{\text{hr}}$$

Thermal Inbreathing: Outbreathing thermal = $60 \cdot \frac{\text{ft}^3}{\text{hr}}$ (from API 2000 Table 2)

Total Inbreathing: Outbreathing total = Outbreathing liquid + Outbreathing thermal

$$\text{Outbreathing total} = 231.4 \cdot \frac{\text{ft}^3}{\text{hr}}$$



Client: Cytec Industries
 Location: Westwego, LA
 Item: ACH Lab Waste Disposal
 System

Job No.: 97-2025M06
 Date: August 21, 1997
 By: THW
 Page: 3 of 3

TANK VENT CAPACITY CALCULATIONS (Continued)

CAPACITIES REQUIRED: (Continued)

Emergency Venting (Pressure Relief):

Case 1: Using API 2000 Paragraph 2.4.3.2 Equation 1 and the properties of water (the major waste constituent).

Environmental Factor:	$F = 1.0$	(API 2000 Table 4, bare metal tank)
Latent Heat of Vaporization:	$L = 970.4 \frac{\text{BTU}}{\text{lb}}$	(water at 14.7 psia)
Temperature (absolute):	$T = 212 - 460$	(degrees Rankine)
Molecular Weight:	$M = 18$	
Heat Input:	$Q = 20000 \cdot \frac{\text{BTU}}{\text{hr} \cdot \text{ft}^2} \cdot (\text{Area}_{\text{tank}})$	(API 2000 Appendix B)
	$Q = 372082 \cdot \frac{\text{BTU}}{\text{hr}}$	

Required Vent Capacity:

$$\text{ReqCap}_1 = 3.091 \cdot \frac{\text{ft}^3}{\text{lb}} \cdot \frac{Q \cdot F}{L} \cdot \frac{T^{0.5}}{M}$$

$$\text{ReqCap}_1 = 7242 \cdot \frac{\text{ft}^3}{\text{hr}}$$

Case 2: Using API 2000 Paragraph 2.4.3.2 Equation (based on the properties of hexane).
 (Used to consider early boiling of volatile waste components.)

$$\text{ReqCap}_2 = 1107 \cdot \frac{\text{ft}^3}{\text{hr}} \cdot F \cdot \frac{\text{Area}_{\text{tank}}^{0.82}}{\text{ft}^2}$$

$$\text{ReqCap}_2 = 12168 \cdot \frac{\text{ft}^3}{\text{hr}}$$

Check: The proposed Oceco 2 inch PV vent will provide more than sufficient pressure and vacuum venting at less than 1.5 inches of water column pressure or vacuum. It will also provide more than the required worst case emergency venting capacity at less than 5 inches of water column pressure. The tank design pressure is 50 psig.

OK

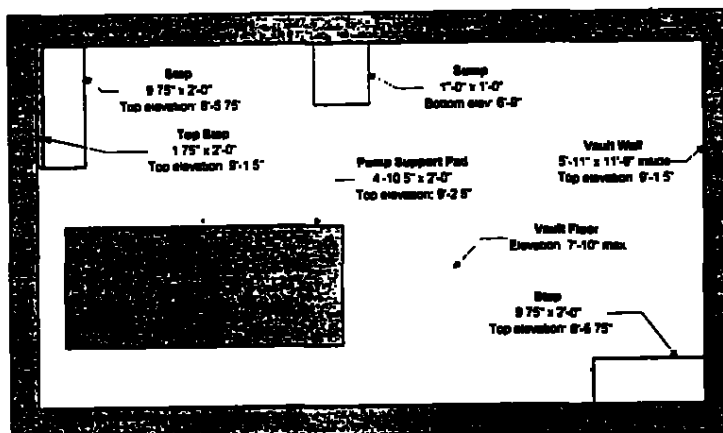


Client: Cytec Industries
 Location: Westwego, LA
 Item: ACH Lab Waste Disposal
 System

Job No.: 97-2025M06
 Date: August 22, 1997
 By: THW
 Page: 1 of 2

SECONDARY CONTAINMENT VAULT CAPACITY

Reference: Cytec Drawing No. 9-1-65 Issue 1



Plan View of Containment Vault (not to scale)

DATA:

Vault Width (inside):	$W_{\text{vault}} = 5\text{ ft} - 11\text{ in}$	
Vault Length (inside):	$L_{\text{vault}} = 11\text{ ft} - 9\text{ in}$	
Vault Wall Top Elevation:	$El_{\text{wall}} = 9\text{ ft} - 1.5\text{ in}$	
Vault Floor Elevation (max.):	$El_{\text{floor}} = 7\text{ ft} - 10\text{ in}$	(used as calculation datum elevation)
Pump Pad Width:	$W_{\text{pad}} = 2\text{ ft} - 0\text{ in}$	
Pump Pad Length:	$L_{\text{pad}} = 4\text{ ft} - 10\text{ in}$	
Pump Pad Top Elevation:	$El_{\text{pad}} = 9\text{ ft} - 1.5\text{ in}$	(effective elevation for capacity purposes)
Step Width:	$W_{\text{step}} = 9.75\text{ in}$	
Step Length:	$L_{\text{step}} = 2\text{ ft} - 0\text{ in}$	
Step Top Elevation:	$El_{\text{step}} = 8\text{ ft} - 5.75\text{ in}$	
Top Step Width:	$W_{\text{tstep}} = 1.75\text{ in}$	
Top Step Length:	$L_{\text{tstep}} = 2\text{ ft} - 0\text{ in}$	
Top Step Top Elevation:	$El_{\text{tstep}} = 9\text{ ft} - 1.5\text{ in}$	
Sump Width:	$W_{\text{sump}} = 1\text{ ft} - 0\text{ in}$	
Sump Length:	$L_{\text{sump}} = 1\text{ ft} - 0\text{ in}$	
Sump Bottom Elevation:	$El_{\text{sump}} = 6\text{ ft} - 9\text{ in}$	
Tank Capacity:	$\text{TankCap} = 40\text{ gal}$	$\text{TankCap} = 5.3\text{ ft}^3$



Client: Cytec Industries
 Location: Westwego, LA
 Item: ACH Lab Waste Disposal
 System

Job No.: 97-2025M06
 Date: August 22, 1997
 By: THW
 Page: 2 of 2

SECONDARY CONTAINMENT VAULT CAPACITY (Continued)

CALCULATIONS: (no credit taken for vault floor slope)

Vault Wall Height:	$H_{\text{wall}} = El_{\text{wall}} - El_{\text{floor}}$	$H_{\text{wall}} = 15.5 \text{ in}$
Pump Pad Height:	$H_{\text{pad}} = El_{\text{pad}} - El_{\text{floor}}$	$H_{\text{pad}} = 15.5 \text{ in}$ (effective height)
Step Height:	$H_{\text{step}} = El_{\text{step}} - El_{\text{floor}}$	$H_{\text{step}} = 7.7 \text{ in}$
Top Step Height:	$H_{\text{tstep}} = El_{\text{tstep}} - El_{\text{floor}}$	$H_{\text{tstep}} = 15.5 \text{ in}$
Sump Depth:	$H_{\text{sump}} = El_{\text{floor}} - El_{\text{sump}}$	$H_{\text{sump}} = 13 \text{ in}$
Gross Containment Area:	$Area_{\text{gross}} = W_{\text{vault}} \cdot L_{\text{vault}}$	$Area_{\text{gross}} = 69.5 \text{ ft}^2$
Gross Containment Volume:	$Vol_{\text{gross}} = Area_{\text{gross}} \cdot H_{\text{wall}}$	$Vol_{\text{gross}} = 89.8 \text{ ft}^3$ $Vol_{\text{gross}} = 671.7 \text{ gal}$
Pump Pad Volume:	$Vol_{\text{pad}} = W_{\text{pad}} \cdot L_{\text{pad}} \cdot H_{\text{pad}}$	$Vol_{\text{pad}} = 12.5 \text{ ft}^3$
Step Volume:	$Vol_{\text{step}} = 2 \cdot (W_{\text{step}} \cdot L_{\text{step}} \cdot H_{\text{step}}) - (W_{\text{tstep}} \cdot L_{\text{tstep}} \cdot H_{\text{tstep}})$ $Vol_{\text{step}} = 2.5 \text{ ft}^3$	
Sump Volume:	$Vol_{\text{sump}} = W_{\text{sump}} \cdot L_{\text{sump}} \cdot H_{\text{sump}}$	$Vol_{\text{sump}} = 1.1 \text{ ft}^3$
Net Containment Volume:	$Vol_{\text{net}} = Vol_{\text{gross}} - Vol_{\text{sump}} - Vol_{\text{pad}} - Vol_{\text{step}} - \text{TankCap}$ $Vol_{\text{net}} = 70.6 \text{ ft}^3$ $Vol_{\text{net}} = 527.9 \text{ gal}$	

Rainfall Capacity: (assuming no run-on)

$$\text{Rainfall} = \frac{Vol_{\text{net}}}{Area_{\text{gross}}} \quad \text{Rainfall} = 12.2 \text{ in}$$



Client: Cylec Industries
 Location: Westwego, LA
 Item: ACH Lab Waste Disposal
 Tank

Job No.: 97-2025M
 Date: December 8, 1997
 By: THW
 Page: 1 of 1

VESSEL MINIMUM SHELL THICKNESS CALCULATION

References: ASME Boiler and Pressure Vessel Code Section 8 Division 1, 1995 Edition, 1996 Add.
 Louisiana Maintenance Services Drawing No. 221 Rev. 2 18" OD Lab Collection Tank

Data:

Outside Diameter:	OD = 18-in	
Design Pressure:	P = 50-psi	
Design Temperature:	400 F	
Material:	SA240-316L	
Allowable Stress:	S = 15600-psi	(ASME Section II Table A-1 @ 400 F)
Joint Efficiency:	E = 1.0	(full radiograph)

Calculation: (reference ASME UG-27 (1))

$$R = \frac{OD}{2} \quad R = 9\text{-in}$$

$$t = \frac{P \cdot R}{S \cdot E - 0.4 \cdot P}$$

$t = 0.029\text{-in}$ Minimum shell thickness required for pressure resistance

Appendix LL

LAC 33:V.523.B., D., G.

Table B-1	Dimensions and Capacity of Each Tank
Table B-2	Tank Drawing Index
Table D-1	Piping Instrumentation and Process Flow Diagrams
Table G-1	Tank System Secondary Containment Information Summary
Table G-2	Tank Containment Information

Hazardous Waste Tank Systems

Cytec Industries Fortier Facility LAD 008 175 390

Table B-1

Subchapter E; Paragraph B - Dimensions and capacity of each tank

<i>Tank No.</i>	<i>Tank Name</i>	<i>Diameter (feet)</i>	<i>Straight Shell Height (ft.)</i>	<i>Nominal Capacity (gallons)</i>
100-5 A	RCB Filter A	8.00	5.00	2,500
100-5 B	RCB Filter B	8.00	5.00	2,500
100-5 C	RCB Filter C	8.00	5.00	2,500
100-6	RCB / MET Backwash Tank	12.13	24.00	19,000
101-52	MMA Lab Collection Tank	1.50	3.00	40
CF-401 A	WW Cartridge Filter	0.33	3.00	2
CF-401 B	WW Cartridge Filter	0.33	3.00	2
CF-401 C	WW Cartridge Filter	0.33	3.00	2
CF-401 D	WW Cartridge Filter	0.33	3.00	2
F-401 A	WW Primary Filter A	8.00	11.50	5,250
F-401 B	WW Primary Filter B	8.00	11.50	5,250
F-401 C	WW Secondary Filter C	7.00	11.00	3,800
F-401 D	WW Secondary Filter D	7.00	11.00	3,500
HRD-V50 A	MET Filter A	8.00	4.00	2,100
HRD-V50 B	MET Filter B	8.00	4.00	2,100
HRD-V50 C	MET Filter C	8.00	4.00	2,100
HRD-V50 D	MET Filter D	8.00	4.00	2,100
MET-1	Miscellaneous Effluent Tank 1	80.00	48.00	1,000,000
MET-2	Miscellaneous Effluent Tank 2	93.00	40.00	2,000,000
MF-307	Secondary Filter Feed Tank	24.00	28.00	95,000
T-500	MET Injection Tank	24.00	18.00	60,000
TA-402	WWCB Well Injection Tank	10.50	15.42	10,000
TA-403	Catalyst Settling Tank	25.00	18.00	60,000

<i>Tank No.</i>	<i>Tank Name</i>	<i>Diameter (feet)</i>	<i>Straight Shell Height (ft.)</i>	<i>Nominal Capacity (gallons)</i>
TA-404	Primary Filter Feed Tank	25.00	16.00	60,000
TA-501 A	WWCB Backwash Tank - North	30.00	30.00	150,000
TA-501 B	WWCB Backwash Tank - South	30.00	30.00	150,000

Hazardous Waste Tank Systems

Table B-2

Cytec Industries Fortier Facility LAD 008 175 390

Tank Drawing Index

<i>Tank No. and Name</i>	<i>Drawing Type</i>	<i>Drawing No.</i>
100-5 A	RCB Filter A	
	Tank / Vessel	T9
	Tank / Vessel	T10
100-5 B	RCB Filter B	
	Tank / Vessel	T11
	Tank / Vessel	T12
100-5 C	RCB Filter C	
	Tank / Vessel	T11
	Tank / Vessel	T12
100-6	RCB / MET Backwash Tank	
	Tank / Vessel	T13
101-52	MMA Lab Collection Tank	
	Tank / Vessel	T14
CF-401 A	WW Cartridge Filter	
	Tank / Vessel	T15
CF-401 B	WW Cartridge Filter	
	Tank / Vessel	T15
CF-401 C	WW Cartridge Filter	
	Tank / Vessel	T15
CF-401 D	WW Cartridge Filter	
	Tank / Vessel	T15
F-401 A	WW Primary Filter A	
	Tank / Vessel	T16
F-401 B	WW Primary Filter B	
	Tank / Vessel	T16
F-401 C	WW Secondary Filter C	
	Tank / Vessel	T17

<i>Tank No. and Name</i>	<i>Drawing Type</i>	<i>Drawing No.</i>
F-401 D	WW Secondary Filter D	
	Tank / Vessel	T18
HRD-V50 A	MET Filter A	
	Tank / Vessel	T19
HRD-V50 B	MET Filter B	
	Tank / Vessel	T19
HRD-V50 C	MET Filter C	
	Tank / Vessel	T20
HRD-V50 D	MET Filter D	
	Tank / Vessel	T20
MET-1	Miscellaneous Effluent Tank 1	
	Tank / Vessel	T21
	Tank / Vessel	T22
MET-2	Miscellaneous Effluent Tank 2	
	Tank / Vessel	T23
MF-307	Secondary Filter Feed Tank	
	Tank / Vessel	T24
T-500	MET Injection Tank	
	Tank / Vessel	T25
TA-402	WWCB Well Injection Tank	
	Tank / Vessel	T26
	Tank / Vessel	T27
TA-403	Catalyst Settling Tank	
	Tank / Vessel	T28
TA-404	Primary Filter Feed Tank	
	Tank / Vessel	T28
TA-501 A	WWCB Backwash Tank - North	
	Tank / Vessel	T29
TA-501 B	WWCB Backwash Tank - South	
	Tank / Vessel	T29

Hazardous Waste Tank Systems

Table D-1

Cytec Industries Fortier Facility LAD 008 175 390

Subchapter E; Paragraph D - Piping Instrumentation and Process Flow Diagrams

<i>Tank No.</i>	<i>Tank Name</i>	<i>Drawing Type</i>	<i>Drawing No.</i>
100-5 A	RCB Filter A	PFD	T1
		P&ID	T3
100-5 B	RCB Filter B	PFD	T1
		P&ID	T3
100-5 C	RCB Filter C	PFD	T1
		P&ID	T3
100-6	RCB / MET Backwash Tank	PFD	T1
		P&ID	T3
101-52	MMA Lab Collection Tank	PFD	T1
		P&ID	T8
CF-401 A	WW Cartridge Filter	PFD	T1
		P&ID	T2
CF-401 B	WW Cartridge Filter	PFD	T1
		P&ID	T2
CF-401 C	WW Cartridge Filter	PFD	T1
		P&ID	T2
CF-401 D	WW Cartridge Filter	PFD	T1
		P&ID	T2
F-401 A	WW Primary Filter A	PFD	T1
		P&ID	T2
F-401 B	WW Primary Filter B	PFD	T1
		P&ID	T2

<i>Tank No.</i>	<i>Tank Name</i>	<i>Drawing Type</i>	<i>Drawing No.</i>
F-401 C	WW Secondary Filter C	PFD	T1
		P&ID	T2
F-401 D	WW Secondary Filter D	PFD	T1
		P&ID	T2
HRD-V50 A	MET Filter A	PFD	T1
		P&ID	T3
HRD-V50 B	MET Filter B	PFD	T1
		P&ID	T3
HRD-V50 C	MET Filter C	PFD	T1
		P&ID	T3
HRD-V50 D	MET Filter D	PFD	T1
		P&ID	T3
MET-1	Miscellaneous Effluent Tank 1	PFD	T1
		P&ID	T6
		P&ID	T7
MET-2	Miscellaneous Effluent Tank 2	PFD	T1
		P&ID	T6
		P&ID	T7
MF-307	Secondary Filter Feed Tank	PFD	T1
		P&ID	T2
T-500	MET Injection Tank	PFD	T1
		P&ID	T3
TA-402	WWCB Well Injection Tank	PFD	T1
		P&ID	T2
TA-403	Catalyst Settling Tank	PFD	T1
		P&ID	T2

<i>Tank No.</i>	<i>Tank Name</i>	<i>Drawing Type</i>	<i>Drawing No.</i>
TA-404	Primary Filter Feed Tank	PFD	T1
		P&ID	T2
TA-501 A	WWCB Backwash Tank - North	PFD	T1
		P&ID	T4
TA-501 B	WWCB Backwash Tank - South	PFD	T1
		P&ID	T4

Hazardous Waste Tank Systems

Table G-1

Cytec Industries Fortler Facility LAD 008 175 390

Tank System Secondary Containment Information Summary

<i>Tank No.</i>	<i>Tank Name</i>	<i>Tank Cap. (gal.)</i>	<i>Inside Containment Area*</i>	<i>Containment Area Plan Drawing</i>	<i>Containment Area Gross Capacity (gallons)</i>	<i>Net** Rainfall Capacity (inches)</i>
100-5 A	RCB Filter A	2,500	Acrylo WTA - North	T-31	180,919	16.8
100-5 B	RCB Filter B	2,500	Acrylo WTA - North	T-31	180,919	16.8
100-5 C	RCB Filter C	2,500	Acrylo WTA - North	T-31	180,919	16.8
100-6	RCB / MET Backwash Tank	19,000	Acrylo WTA - North	T-31	180,919	15.2
101-52	MMA Lab Collection Tank	40	MMA Lab Collection Tank	T-40	568	12.1
CF-401 A	WW Cartridge Filter	2	Acrylo WTA - North	T-31	180,919	17.0
CF-401 B	WW Cartridge Filter	2	Acrylo WTA - North	T-31	180,919	17.0
CF-401 C	WW Cartridge Filter	2	Acrylo WTA - North	T-31	180,919	17.0
CF-401 D	WW Cartridge Filter	2	Acrylo WTA - North	T-31	180,919	17.0
F-401 A	WW Primary Filter A	5,250	Acrylo WTA - North	T-31	180,919	16.5
F-401 B	WW Primary Filter B	5,250	Acrylo WTA - North	T-31	180,919	16.5
F-401 C	WW Secondary Filter C	3,800	Acrylo WTA - North	T-31	180,919	16.6
F-401 D	WW Secondary Filter D	3,500	Acrylo WTA - North	T-31	180,919	16.7
HRD-V50 A	MET Filter A	2,100	Acrylo WTA - North	T-31	180,919	16.8
HRD-V50 B	MET Filter B	2,100	Acrylo WTA - North	T-31	180,919	16.8
HRD-V50 C	MET Filter C	2,100	Acrylo WTA - North	T-31	180,919	16.8
HRD-V50 D	MET Filter D	2,100	Acrylo WTA - North	T-31	180,919	16.8
MET-1	Miscellaneous Effluent Tank 1	1,000,000	Utilities - MET	T-37	2,755,901	31.2
MET-2	Miscellaneous Effluent Tank 2	2,000,000	Utilities - MET	T-37	2,755,901	13.4

* "Acrylo WTA" is the Acrylonitrile Waste Treatment Area

** Rainfall containment capacity of containment area while simultaneously holding the full volume of that tank.

<i>Tank No.</i>	<i>Tank Name</i>	<i>Tank Cap. (gal.)</i>	<i>Inside Containment Area*</i>	<i>Containment Area Plan Drawing</i>	<i>Containment Area Gross Capacity (gallons)</i>	<i>Net** Rainfall Capacity (inches)</i>
MF-307	Secondary Filter Feed Tank	95,000	Acrylo WTA - South	T-30	287,830	22.6
T-500	MET Injection Tank	60,000	Acrylo WTA - North	T-31	180,919	11.4
TA-402	WWCB Well Injection Tank	10,000	Acrylo WTA - North	T-31	180,919	16.1
TA-403	Catalyst Settling Tank	60,000	Acrylo WTA - South	T-30	287,830	26.8
TA-404	Primary Filter Feed Tank	60,000	Acrylo WTA - South	T-30	287,830	26.8
TA-501 A	WWCB Backwash Tank - North	150,000	Acrylo WTA - South	T-30	287,830	16.2
TA-501 B	WWCB Backwash Tank - South	150,000	Acrylo WTA - South	T-30	287,830	16.2

* "Acrylo WTA" is the Acrylonitrile Waste Treatment Area

** Rainfall containment capacity of containment area while simultaneously holding the full volume of that tank.

Hazardous Waste Tank Systems

Table G-2

Cytec Industries Fortier Facility LAD 008 175 390

Tank Containment Information

<i>Tank No.</i>	<i>Tank Name</i>	<i>Tank Location</i>	<i>Tank Bottom Leak Detection Method</i>	<i>Secondary Containment Dwg. Nos.</i>
100-5 A	RCB Filter A	Above ground	Visual	T31
100-5 B	RCB Filter B	Above ground	Visual	T31
100-5 C	RCB Filter C	Above ground	Visual	T31
100-6	RCB / MET Backwash Tank	On-ground	Liner with collection pots	T31 T34 T36
101-52	MMA Lab Collection Tank	Above ground	Visual	T40
CF-401 A	WW Cartridge Filter	Above ground	Visual	T31
CF-401 B	WW Cartridge Filter	Above ground	Visual	T31
CF-401 C	WW Cartridge Filter	Above ground	Visual	T31
CF-401 D	WW Cartridge Filter	Above ground	Visual	T31
F-401 A	WW Primary Filter A	Above ground	Visual	T31

<i>Tank No.</i>	<i>Tank Name</i>	<i>Tank Location</i>	<i>Tank Bottom Leak Detection Method</i>	<i>Secondary Containment Dwg. Nos.</i>
F-401 B	WW Primary Filter B	Above ground	Visual	T31
F-401 C	WW Secondary Filter C	Above ground	Visual	T31
F-401 D	WW Secondary Filter D	Above ground	Visual	T31
HRD-V50 A	MET Filter A	Above ground	Visual	T31
HRD-V50 B	MET Filter B	Above ground	Visual	T31
HRD-V50 C	MET Filter C	Above ground	Visual	T31
HRD-V50 D	MET Filter D	Above ground	Visual	T31
MET-1	Miscellaneous Effluent Tank 1	On-ground	Dbl btm w/ collection pots	T37 T38
MET-2	Miscellaneous Effluent Tank 2	On-ground	Liner with collection pots	T37 T38 T39
MF-307	Secondary Filter Feed Tank	On-ground	Liner with collection pots	T30 T33 T35

<i>Tank No.</i>	<i>Tank Name</i>	<i>Tank Location</i>	<i>Tank Bottom Leak Detection Method</i>	<i>Secondary Containment Dwg. Nos.</i>
T-500	MET Injection Tank	On-ground	Liner with collection pots	T31 T34 T35
TA-402	WWCB Well Injection Tank	On-ground	Double bottom	T31 T34 T35
TA-403	Catalyst Settling Tank	On-ground	Liner with collection pots	T30 T33
TA-404	Primary Filter Feed Tank	On-ground	Liner with collection pots	T30 T33
TA-501 A	WWCB Backwash Tank - North	On-ground	Liner with collection pots	T30 T32
TA-501 B	WWCB Backwash Tank - South	On-ground	Liner with collection pots	T30 T32